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STEEL

ESTABLISHED 1882

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PRODUCTION • PROCESSING • DISTRIBUTION • USE

How Silico-Manganese improves Rimming Steel

WHEN silico-manganese is added to rimming steel shortly before tapping, a cleaner, better steel is produced. The inclusions formed have appreciably lower melting points and are of a modified type. Results indicate that this modified type of inclusion decreases the age-hardening tendency of rimming steel. In addition, this silico-manganese treatment permits a reduction in the use of other deoxidizers that lead to objectionable inclusions.

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PRODUCTS OF A UNIT OF UCC UNION CARBIDE AND CARBON CORPORATION

As the Editor Views the News

■ FIRST QUARTER earnings by 14 iron and steel producers which control 85.6 of the country's ingot capacity (p. 15) were $10,169,925. This compares with a loss of $3,788,575 in last year's first quarter. Steelmakers must become more cost-minded and must increase their profit margin as a due to stockholders whose investment makes possible the steel industry, said E. G. Grace at Bethlehem Steel Corp.'s quarterly meeting. . . . Total net income of 73 companies in the metalworking field in the first quarter (p. 16) was more than double that of the same companies in the first quarter of last year. . . . Profit outlook for second quarter is less encouraging. Steel production again moved down last week and now (p. 17) is at 49 per cent of ingot capacity. Further recession is expected.

• • •

Furnaces Banked

Despite the continued coal mining tie-up scarcity of coal as yet has had no serious effects in the metal producing and metalworking industries. To conserve supplies, steel companies (p. 18) have banked some additional blast furnaces. . . . . In addition to thorough discussion of operating problems, last week's joint conference of the open hearth, blast furnace and raw materials committees was featured (p. 22) by consideration of matters affecting industrial relations. Practically all grievances are simple matters in the early stages, it was said, and if handled properly few of them advance to troublesome proportions. . . . Plans are announced for the forty-eighth general meeting of the American Iron and Steel institute (p. 33) to be held in New York, May 25.

• • •

Fireproof Liner

War department (p. 26) has awarded the first six "educational" orders for war materials. . . . Out of a long list of disastrous fires at sea, culminating in the huge loss of life on the MORRO CASTLE in 1934, finally has come a fireproof passenger ship. The PANAMA, first liner placed in service under the new safety specifications of the bureau of marine inspection and navigation (p. 33), is characterized by new and extensive uses of steel. . . . Acute shortage of skilled labor (p. 27) confronts the various branches of our rapidly growing aviation industry. . . . Outstanding in the market (p. 82) is an inquiry for 150,000 tons of steel sheets for construction of air raid shelters in Europe. . . . The machine tool builders (p. 34) see fallacious public and legislative reasoning as on the wane and expect a good year.

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Building Necessary

A vast amount of employment could be created if cities, towns or trading areas sponsored the huge amount of building and rebuilding work that is necessary or desirable, says an authority (p. 40); private industry cannot undertake the promotional work involved . . . Due to a galvanic action similar to that exerted by galvanized zinc coats, zinc-dust paints deter rust formation; they have an important place (p. 42) in the maintenance of metal surfaces . . . An open hearth furnace with a more refractory bottom, designed for complete drainage so as to prevent injurious bottom boils (p. 44), showed a 48.4 per cent saving in installation cost and furnace time as compared with conventional construction. It made 19 heats in a week, averaging 8¾ hours from tap to tap, and 1543 gross tons per hour.

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Overhead Track Code

Now available is a new code (p. 46) covering overhead track systems . . . An improved method simplifies handling of wire rope in storage . . . Horsepower ratings of oak tanned, flat leather belting have been announced (p. 48) by the American Belting association . . . Interesting details feature new blast furnace and coke oven installations (p. 52) of Great Lakes Steel Corp. . . . by changing from manual to mechanical handling, a food display equipment manufacturer (p. 54) has eliminated scratching and bending of sheets in unloading and storage . . . A tubular furniture manufacturer has a technique (p. 58) whereby plated and polished parts are welded without damage to surfaces . . . A new system of oscillating die movement and press action (p. 64) offers smooth operation, long die life and high speeds.

E C Kreutzberg

IT SHALL BE DONE

"Madame," said Talleyrand, "if it is possible, it shall be done—and if it is impossible, it shall be done!"

A polished phrase of a courtier and diplomat—but it is accurately descriptive of how Inland seeks to serve those who turn to us for counsel and service—and steel.

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SHEETS STRIP TIN PLATE BARS PLATES FLOOR PLATES STRUCTURALS PILING RAILS TRACK ACCESSORIES REINFORCING BARS

Steel's Meager Three-Months Profit 25.4% Less Than in Fourth Quarter

■ FOURTEEN leading iron and steel producers, representing 85.6 per cent of total ingot capacity, report net earnings in the first three months this year were $10,169,925, or 25.4 per cent lower than the $13,629,009 reported by the same companies for the fourth quarter last year. In the first quarter of 1938, the 14 producers incurred an aggregate net loss of $3,788,575.

Assuming the experience of these producers to be typical, indicated net income for the entire industry approximated $11,880,000, or about $1.25 per ton on the 9,506,594 tons of ingots produced. This compares with indicated earnings of $1.62 per ton of ingots produced in the fourth quarter last year, and with a net loss of 92 cents per ton of ingots made in the first quarter of 1938.

Ingot operations for the industry averaged 54.14 per cent of capacity in the March quarter, down slightly from the 55.77 per cent average in the fourth quarter 1938. In the first quarter of 1938, operations averaged 31.58 per cent.

Output Exceeds New Business

Bethlehem Steel Corp.'s net profit for first quarter was $2,409,059, equal to 17 cents a common share after preferred dividends. This compares with $3,658,160 net for the fourth quarter of 1938, and $994,908 in the first period of 1938.

Directors declared a dividend of $1.75 on the 7 per cent cumulative preferred and 25 cents on the 5 per cent cumulative preferred, both payable July 1 to stockholders of record June 2.

Commenting on the outlook for the remainder of the current quarter, E. G. Grace, president, said: "I don't see anything to indicate important change in the steel business either way. I don't look for the bottom to drop out of things, nor do I see any prospects for sharp improvement. Rather, I look for a slight shinkage."

Incoming orders recently have been falling behind production. Bethlehem's rated production for last month was 59 per cent, Mr. Grace said, while new tonnage was coming in at a rate of about 49 per cent.

Estimated value of orders on hand March 31 was $192,040,906, a new peace-time high, and represents some important shipwork. Orders on hand Dec. 31, 1938, totaled $162,774,713, and on March 31, 1938, $99,934,192.

"Steelmakers' Own Fault"

Automobile buying has been disappointing this year, Mr. Grace declared, adding the next important automotive buying probably would come about the end of May or early in June for 1940 models.

His attention was called to the concessions made on automotive steel earlier and to the relatively fine financial showing of automakers, as compared with steel earnings.

"If the steel industry can't make a profit on the steel it sells to consumers," he said, "it is its own fault —certainly not the consumers'."

Steelmakers must become more cost-minded—the essence of management, he added. Cost factors for the past nine or ten months have been relatively constant. Yet much tonnage booked within that period has been at lower prices. He indicated there is little that can be done to reduce costs that already has not been done by most companies. This, he emphasized, should be considered by producers in formulating their pricing and merchandizing policies.

Nine months ago, Mr. Grace said, Bethlehem's "break even" point was close to 35 per cent, possibly a shade higher; today, he figured, it is around 50 per cent.

It is plainly evident, he said, that the steel industry must increase its

Schwab Just 77—"No Important Change"

■ **Chairman of Bethlehem Steel, who passed his seventy-seventh milestone April 18, attended the stockholders meeting last week, heard President Grace say, concerning the immediate outlook: "I don't see anything to indicate important change in steel business either way." Left to right: Mr. Grace, Mr. Schwab, and Hoyt A. Moore, New York lawyer. Wide World photo**

Steel Producers' First Quarter Financial Summary

	First Quarter 1939	First Quarter 1938	Fourth Quarter 1938	Ingot Capacity gross tons
U. S. Steel Corp.	$660,551	$1,292,151*	$4,432,914	25,790,000
Bethlehem Steel Corp.	2,409,059	994,908	3,658,160	10,042,000
Republic Steel Corp.	532,899	3,062,564*	308,613	6,500,000
Jones & Laughlin Steel Corp.	376,525*	1,269,725*	1,147,506*	3,660,000
National Steel Corp.	2,426,669	1,088,635	2,753,156	3,400,000
Youngstown Sheet & Tube Co.	217,107	139,529*	90,108	3,120,000
American Rolling Mill Co.	793,479	197,310*	27,721*	2,669,520
Inland Steel Co.	2,024,601	923,076	1,759,785	2,760,000
Wheeling Steel Corp.	828,661	531,035*	1,042,153	1,750,000
Sharon Steel Corp.	7,613	151,090*	267,655	500,000
Continental Steel Corp.	279,178	55,208	228,000	325,000
Keystone Steel & Wire Co.	317,608	187,569	115,728	250,000
Wickwire Spencer Steel Co.	158,753*	331,916*	10,499*	150,000
Rustless Iron & Steel Corp.	207,778	62,651*	158,463	†35,700
Totals	$10,169,925	$3,788,575*	$13,629,009	60,592,220
FINISHING CAPACITY ONLY				
Acme Steel Co.	$339,671	$ 969	$202,726	.....
Superior Steel Corp.	6,773*	141,167*	.....	.....
PIG IRON CAPACITY ONLY				
Virginia Iron, Coal & Coke Co.	$ 36.811*	$ 28,064*	$ 22,847*	.....

*Loss. †Stainless steel ingots.

profit margin. This is due the stockholders whose investment makes possible the steel industry.

The corporation expects to spend about $10,000,000 this year on routine improvements and maintenance; no special expansion program is contemplated.

U. S. STEEL'S SHIPMENTS UP; NET INCOME DOWN

United States Steel Corp.'s net income applicable to capital stock amounted to $660,551 in the first quarter this year, compared with $4,432,914 for fourth quarter last year, and $1,292,151 deficit in the first quarter, 1938.

First quarter shipments totaled 2,235,209 tons, or 9.7 per cent more than the 2,037,144 tons in the previous quarter, and 42.8 per cent increase over first quarter, 1938, shipments of 1,565,244 tons. First quarter shipments amounted to 50.2 per cent of capacity, and production was at an average rate of 51.7 per cent of capacity.

Lower earnings despite improved operations, the corporation says, reflects the generally lower average level of prices realized without proportionately compensating adjustments in labor and material costs, which continue at the high levels of last year.

Although the corporation's shipments in the first quarter exceeded those of the last quarter of 1938, the increase was less than the normal seasonal expectation. This is considered not surprising in view of the expanding activity in the latter part of last year and the uncertain foreign conditions with which business recently had to contend.

Directors voted the regular quarterly $1.75 dividend on preferred stock, payable May 20.

Total net working assets, before deducting current dividend declaration: At March 31, $426,924,776; at Dec. 31, 1938, $426,984,023.

These amounts are calculated on basis of including in current liabilities capital obligations due within one year and excluding from current assets the receivables not collectible within one year. Both adjustments have the effect of reducing the net current asset position from that previously shown.

Construction and plant improvement expenditures in first quarter were limited to completing projects underway at the beginning of the period and to maintenance work. Outlays for such work, less credits for property sold, were approximately $3,600,000. At April 1, unexpended balance on approved appropriations for property additions and betterments amounted to about $19,000,000.

Employment and payroll statistics:

	Average Number of Employes	Total Payroll
First quarter, 1939	208,898	$83,065,315
Fourth quarter, 1938	203,822	79,720,866
First quarter, 1938	211,883	68,315,602

NATIONAL EARNS PROFIT FOR 37TH CONSECUTIVE QUARTER

National Steel Corp.'s net earnings for first quarter were $2,426,668.79, equal to $1.10 a share on the

Consumers' First Quarter Net Profit Up Sharply

■ TOTAL net income of 73 companies among equipment manufacturers, suppliers and consumers in the first quarter aggregated $23,175,024, an increase of 105.1 per cent over the $11,299,096 total income reported in the first quarter, 1938. STEEL's tabulation, April 24, page 19, included 31 companies, while the following table lists 42. Only six of the 73 consumers reported a net loss last quarter, against 32 in the initial 1938 period. All figures are net income, except where asterisk denotes loss.

	First Quarter		First Quarter Income Per Common Share	
	1939	1938	1939	1938
Aetna Ball Bearing Mfg. Co., Chicago	$ 63,552	$ 929*	$0.52	$0.01*
Allis-Chalmers Mfg. Co., Milwaukee	710 277	1,403,649	0.40	0.79
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.	2,577	40,404*	0.01	0.20*
Bower Roller Bearing Co., Detroit	219,954	81.213	0.73	0.27
Briggs & Stratton Corp., Milwaukee	344,188	165,513	1.15	0.55
Budd Wheel Co., Philadelphia	135,506	195,961*	0.13	0.21*
Campbell, Wyant & Cannon Fdry. Co., Muskegon	1,250	80,176*	0.003	0.23*
City Auto Stamping Co., Toledo, O.	33,412*	4,186*	0.09*	0.01*
Clark Equipment Co., Buchanan, Mich.	243,791	26,210	0.89	0.02*
Copperweld Steel Co., Glassport, Pa.	200,236	131,458	0.46	0.30
Diamond T Motor Car Co., Chicago	46,296	19,857*	0.11	0.05*
Easy Washing Machine Corp., Syracuse, N. Y.	95,870	126,341*	0.18	0.24*
E. G. Budd Mfg. Co., Philadelphia	101,389	256,912*	0.001*	0.22*
Electrolux Corp., New York	443,913	668,246	0.36	0.54
Ex-Cell-O Corp., Detroit	149,711	132,063	0.38	0.34
Florence Stove Co., Gardner, Mass.	106,333	47,370	0.31	0.14
Gardner-Denver Co., Quincy, Ill.	216,770	61,356	0.33	0.06
General Cable Corp., New York	196,773*	66,147*	1.28*	1.21*
Houdaille-Hershey Corp., Detroit	407,140	29,329	0.38	0.10*
Hoskins Mfg. Co., Detroit	97,980	57,228	0.20	0.12
L. C. Smith & Corona Typewriters Inc., Syracuse	117,664	118,957	0.36	0.36
Link-Belt Co., Chicago	199,161	234,090	0.22	0.26
Master Electric Co., Dayton, O.	94 277	52,804	0.45	0.25
Marchant Calculating Machine Co., Oakland, Calif.	168,894	151,431	0.73	0.65
Marion Steam Shovel Co., Marion, O.	32,685*	106,115*	0.83*	1.60*
Minneapolis-Honeywell Regulator Co., Minneapolis	67.289	17,410*	0.06	0.08*
Mullins Mfg. Corp., Salem, O.	94,840	135,086*	0.08	0.34*
Nash-Kelvinator Corp., Kenosha, Wis.	140,505	2,185,657*	0.03	0.51*
National Acme Co., Cleveland	53,836	189,951	0.11	0.38
Pittsburgh Coke & Iron Co., Pittsburgh	94,026	77,689	0.11	0.08
Reed Roller Bit Co., Houston, Tex.	406,445	420,648	0.65	0.67
Savage Arms Corp., New York	43,868*	50,123*	0.26*	0.30*
Seagrave Corp., Columbus, O.	26,405*	5,606	0.25*	0.01
Signode Steel Strapping Co., Chicago	87,599	4,964*	0.51	0.18*
Spicer Mfg. Corp., Toledo, O.	438,872	142,469*	1.29	0.65*
Square D Co., Detroit	120,600	65,641	0.35	0.19
Stewart-Warner Corp., Chicago	146,275	215,166*	0.12	0.17*
Studebaker Corp., South Bend, Ind.	56,914	1,072,352*	0.02	0.49*
Thompson Products Inc., Cleveland	325,156	93,492*	1.07	0.36*
Truscon Steel Co., Youngstown, O.	20,418	395,144*	0.05*	0.59*
United Aircraft Corp., New York	1,490,799	1,072,298	0.56	0.42
U. S. Hoffman Machinery Corp., New York	2,441	15,925*	0.07*	0.16*

2,198,967 outstanding shares. This compares with $1,088,635.50 net profit, equal to 50 cents a share, for first quarter, 1938.

The past period marks the thirty-seventh consecutive quarter that National Steel has reported net earnings and paid dividends, since its organization in November, 1929.

INLAND STEEL'S EARNINGS EQUAL $1.28 PER SHARE

Inland Steel Co., Chicago, reports $2,024,600.54 net profit in the first three months this year, equal to $1.28 a share on the 1,578,600 shares outstanding. Directors declared a dividend of 50 cents payable June 1 to stockholders of record May 16.

First quarter profits compare with $923,076 in the first period last year, and $1,759,785 in the fourth quarter of 1938.

WHEELING STEEL EARNS 61 CENTS ON COMMON

Wheeling Steel Corp. and subsidiaries earned consolidated net profit of $828,661 for the first quarter, contrasted with a $531,035 net loss in the first period last year.

First quarter earnings are equal, after dividend requirements on 351,092 shares of $5 prior preferred and 28,546 shares of 6 per cent preferred, to 61 cents a share on 563,637 outstanding common shares.

YOUNGSTOWN SHEET & TUBE

Youngstown Sheet & Tube Co., Youngstown, O., reports $217,106.64 net profit for first quarter, compared with $90,108 in the preceding period, and a deficit of $139,529 in the first quarter, 1938.

Profit from operations before providing for depletion of minerals and plant depreciation, but after provision for estimated federal income tax, was $2,687,210.50; other income, $297,585.09. Interest charges were $937,962.77; provision for depletion and depreciation, $1,670,990.11; other charges, $158,736.07.

ALLEGHENY LUDLUM

Allegheny Ludlum Steel Corp. reports net income for first three months this year was $206,582. This company has been omitted from the accompanying producers' earnings table because comparable figures for earlier periods are not available. Allegheny Steel Co. and Ludlum Steel Co. merged in August, 1938.

DIVIDENDS DECLARED

Vanadium-Alloys Steel Co., Pittsburgh, 25 cents on common, payable June 2 to record May 20. Previous payment was 60 cents on March 2, 1938.

Midland Steel Products Co., Cleveland, $2 on 8 per cent cumulative first preferred, 50 cents on noncumulative preferred and 50 cents on common. All are payable July 1 to record June 16. First quarter net profit totaled $540,966.

A. M. Byers Co., Pittsburgh, $1.75 and interest of 46 2/3 cents on arrearages on the preferred stock, payable June 1 to record May 10.

Copperweld Steel Co., Glassport, Pa., 20 cents on capital stock, payable June 10 to record June 1. In the previous quarter 40 cents was paid on stock which has since been split two for one.

United Engineering & Foundry Co., Pittsburgh, 50 cents on common, payable May 16 to record May 5. Same amount was paid Feb. 14.

STEEL INDUSTRY'S LOSS $14,879,000 IN 1938

The steel industry incurred a net loss of $14,879,000, after all charges but before dividends, in 1938, according to the American Iron and Steel institute, which compiled reports from nearly 100 companies representing more than 90 per cent of capacity. In 1937, the same companies earned $228,276,000.

Last year was the fifth since 1930 in which the industry operated at a loss, 1935, 1936 and 1937 being the exceptions. The industry's return on investment since 1930 has averaged only 1.2 per cent.

Total payrolls of the companies last year, including some subsidiaries which do not produce iron or steel, amounted to $730,367,000, against $1,118,131,000 in 1937. This decrease was less than 35 per cent, against declines of 92 per cent in earnings before interest charges and of 44 per cent in steel production.

Dividends to 519,000 stockholders in reporting companies were 76 per cent lower than in 1937. The total of $48,952,000 in dividends represented a return of 2 per cent on value of common and preferred stocks outstanding, while dividends of $149,448,000 in 1937 were equivalent to a return of 5.7 per cent.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended April 29	Change	Same week 1938	Same week 1937
Pittsburgh ..	43	None	26	90
Chicago	49.5	— 4	33.5	85.5
Eastern Pa...	37	— 1.5	27.5	70.5
Youngstown..	43	None	29	87
Wheeling	63	— 2	46	88
Cleveland ...	39	+ 2.5	32	79.5
Buffalo	37.5	— 9	28	93
Birmingham..	55	— 5	66	83
New England	43	+ 8	27	93
Cincinnati ...	52	+ 6	30	90
St. Louis.....	42	— 2.5	36.3	94
Detroit	59	+ 2	18	100
Average....	49	— 1.5	32	91

PRODUCTION

■ STEELWORKS operations last week declined 1.5 points to 49 per cent, lowest since mid-October, except for the final week in December. Reductions were noted in six districts, advances in four and two were unchanged. A year ago the rate was 32 per cent.

Youngstown, O.—Steady at 43 per cent, 38 open hearths active. The same rate is scheduled this week.

Chicago — Down 4 points to 49.5 per cent after four weeks at 53.5 per cent. Carnegie-Illinois Steel Corp. has taken off a blast furnace at Gary, and one at South Works.

Cincinnati — Increased 6 points to 52 per cent through relighting of open hearths recently threatened by high water.

St. Louis—Receded 2.5 points to 42 per cent, as result of smaller open hearths being operated.

Detroit — Up 2 points to 59 per cent, resulting from change to open hearths of larger capacity by one producer.

Pittsburgh—Held at 43 per cent, starting the week higher but tapering at the close.

Wheeling—Smaller production at one plant resulted in 2 points reduction to 63 per cent.

Central eastern seaboard—Loss of 1.5 points to 37 per cent, with further contraction this week as two interests will drop one open hearth each.

New England—Advanced 8 points to 43 per cent, one open hearth being added. The same rate is scheduled this week.

Buffalo — Down 9 points to 37.5 per cent as four furnaces were taken off.

Birmingham, Ala. — Dropped 5 points to 55 per cent. Eleven open hearths are in production. One blast furnace has been banked.

Cleveland—Increased 2.5 points to 39 per cent, with only slight change indicated for this week.

50th Year for Heppenstall

■ Fiftieth anniversary of the Heppenstall Co., Pittsburgh, was observed last week at the company's Bridgeport, Conn., plant by honoring Chairman C. W. Heppenstall for 46 years' service and by presenting service medals to other veteran workers.

Feature of the ceremonies was the unveiling by President Charles S. Lindsay of a bronze plaque bearing Mr. Heppenstall's likeness and the names of veteran employes. A. J. Porter Jr., general manager at Bridgeport plant, presented service medals to those with 25, 20, 15 and ten years' service.

Coal Stringency More Pronounced

■ EFFECTS of the suspension of operations since April 1 at most of the country's bituminous coal mines became apparent last week.

Steel producers and railroads have been the principal sufferers from the tieup, the latter not only from the dwindling of supplies of fuel, but also loss of coal traffic. As a result several roads have closed their shops or have laid off a number of employes.

Curtailment of shop activity in turn has affected steel orders. In addition, steelworks have taken further steps to conserve coal and coke by banking blast furnaces or reducing blast. Coke oven operations also have been slowed at some plants. Between 10 and 15 blast furnaces have been banked the past two weeks, although the decline in steel business was responsible for a part of the suspension.

Supplies for Several Weeks

In certain districts coal and coke reserves are regarded ample for several more weeks' requirements and a few steel companies express no concern over appearance of an acute shortage prior to settlement of differences between operators and miners.

According to the bureau of mines, a 35-day coal supply was above ground April 15, although the tonnage was not evenly distributed and would require reallocation to last through the indicated period.

Possibility was seen that coal might be shipped from docks at the head of the Great Lakes to lower ports, a reversal of the usual trend at this period with the opening of navigation. Northern stocks are larger than usual, because of the recent mild winter.

Another possible development of a reverse order is that the national bituminous coal commission, created primarily to fix minimum coal prices, might step in to prevent prices from skyrocketing in the event the mine shutdown became prolonged.

In the meantime the federal labor department continued its efforts to negotiate a settlement between representatives of miners and operators, with no definite results reported late last week.

5000 AT COAL CONVENTION; $2,000,000 IN EQUIPMENT

Five thousand delegates attended the sixteenth annual coal convention and exposition of the American Mining Congress in Cincinnati last week. The exposition featured $2,000,000 worth of mining equipment.

Federal regulations, mechanization and accident prevention were recurring subjects in the formal program, while informally there was considerable discussion of labor difficulties now proving a barrier to the industry.

The manufacturers' division elected these officers: Chairman, Frank E. Mueller, vice president, Roberts & Schaefer Co., Chicago; first vice chairman, Arthur S. Knoizen, Joy Mfg. Co., Franklin, Pa.; second vice chairman, E. J. Burnell, Link-Belt Co., Chicago; third vice chairman, E. F. Carley, E. I. du Pont de Nemours Co., Wilmington, Del.

Allis-Chalmers To Build New Plant at Pittsburgh

■ Contracts for a new transformer plant in Pittsburgh, to be known as the River plant, have been let by Allis-Chalmers Mfg. Co., Milwaukee.

Plant will be 416 x 144 feet; will cost, with buildings and equipment, about $378,000; and will be operating about Aug. 15.

In design, plant will represent the latest manufacturing methods as applied to the production of distribution transformers. It will be set up on a line production basis—raw material coming in at one end and a finished product going out at the other—and will generally increase efficiency.

General contractor is H. M. Siesel Construction Co., Milwaukee and Pittsburgh. Contracts for the steel work were awarded to Bethlehem Steel Co.

Chrysler Plans Expansion Of California Plant

■ Extensive modernization and improvement program for the Los Angeles plant of Chrysler Corp. will be undertaken shortly.

This includes installation of entire new rustproofing and finishing equipment, new material handling equipment, extensive rearrangement and modernization of the passenger car and truck assembly lines, new concrete receiving and shipping docks, two large additions to the plant, paved parking lot for employes, half a mile of concrete road on company property, and new gate house.

The new enameling department will house rustproofing and spraying equipment and drying ovens; spray rooms will be completely air-conditioned. Wiring machines, welders, punch presses, metal finishers and conveyors will be required.

Wiremakers in Regional Meeting

■ FIRST New England regional meeting of the Wire association, in Worcester, Mass., April 25, was attended by 100 associated with the wire manufacturing industry. The meeting included a visit to the Norton Co., where relation of abrasives to the industry was emphasized; and a dinner featuring two technical papers. R. R. Tatnall, metallurgist, Wickwire Spencer Steel Co., Worcester, and chairman of the local committee, presided at evening session.

Importance of research was stressed by M. F. Beecher, Norton research director. The modern laboratory, he said, has a vital function in servicing production and sales departments in addition to developing new facts by which better processing of materials is made possible. The successful research worker must ever be critical and somewhat fault-finding, in Mr. Beecher's opinion.

Describes Company's Research

He described the program of research maintained by his company in which is involved development of new materials and improvement of those already in use. No laboratory bats 100 per cent, he declared, such technical procedure being co-ordination of logical thought with proper technical tools, including good training and background.

C. G. Johnson, assistant professor of mechanical engineering, Worcester Polytechnic institute, discussed use of the microscope in metallurgy. Admitting that while steady and valuable progress has been made in utilization of this instrument, he feels considerable remains to be done. Metallurgists still are far from knowing much about metallography in the wire industry.

Prof. Johnson pointed out certain fundamental facts can be ascertained with a relative degree of accuracy by use of the microscope, including plasticity, making rolling of metal possible, carbon content and control, pearlite, oxidation, crystal distortion in work hardening, and heat treating.

F. A. Westphal, superintendent of wire mills, Sheffield Steel Corp., Kansas City, Mo., and president of the Wire association, announced regional meetings now are part of the organization's program. Richard E. Brown, executive secretary, Stamford, Conn., commenting upon relationship of the wire industry and the association, asserted that more and more control in the industry will pass to metallurgists and technical men.

MEN OF INDUSTRY

■ G. COOK KIMBALL, the past four years executive vice president, Carnegie-Illinois Steel Corp., has been elected an executive vice president, United States Steel Corp. of Delaware, with offices in Chicago. Formal announcement was made by B. F. Fairless, president, United States Steel Corp., at a luncheon last Wednesday in the Blackstone hotel, Chicago, attended by officers and directors of the corporation and several hundred civic and business leaders.

This promotion gives recognition to the importance of Chicago in the Steel corporation organization, mills in the Chicago district representing about 20 per cent of its capacity, Pittsburgh area capacity being only slightly larger.

Mr. Kimball has been associated with United States Steel subsidiaries since 1901, starting in the engineering department of American Tin Plate Co. From 1905 to 1931 he was chief engineer of American Sheet & Tin Plate Co., then being elected a vice president and director of that company. He is a director of Carnegie-Illinois Steel Corp., president of Illinois Steel Co. and Gary Land Co. and a director of Illinois Manufacturers' association. He is a member of the American Iron and Steel institute, and numerous civic organizations.

G. Cook Kimball

♦

Charles J. Stilwell has been elected president, Warner & Swasey Co., Cleveland, succeeding the late Philip E. Bliss. Clifford S. Stilwell, brother, has been made executive vice president, and L. D. McDonald, assistant treasurer, has been named vice president.

Upon graduation from Denison university in 1910, Charles Stilwell entered the employ of Warner & Swasey as a machine operator. In 1911 he was transferred to the sales department, rose rapidly to the position of district manager at New York. In 1914 he was European representative, five years later was export sales manager. He became general sales manager in 1922, and in 1929 vice president and a director. Mr. Stilwell served as president of the National Machine Tool Builders' association in 1934.

Clifford Stilwell graduated from Denison in 1912 and joined Warner & Swasey as a special apprentice. In 1913 he was salesman in Chicago territory, and a year later was district manager at Detroit. He became general sales manager in 1930, a director in 1934 and vice president in 1935.

♦

Col. Frank A. Scott, Cleveland, has been appointed to the executive committee of Youngstown Sheet & Tube Co., Youngstown, O., to serve during the illness of H. G. Dalton, board chairman.

♦

Eugene D. Hopper has been elected a director, Aetna-Standard Engineering Co., Youngstown, O.

♦

Vincent Cada, Eaton Mfg. Co., Cleveland, has been elected president, Purchasing Agents Association of Cleveland Inc.

♦

G. M. Bowen has become acting president of Ross Operating Valve Co., Detroit, following the death of C. A. Ross, founder and president.

♦

A. N. Snyder, Wohlert Corp., Lansing, Mich., has been elected president, Purchasing Agents Association of Central Michigan.

♦

F. J. Beckley, treasurer and assistant secretary, L. A. Young Spring & Wire Corp., Detroit, has been elected a director.

♦

Hugh W. Hitchcock has been appointed advertising manager, Packard Motor Car Co., Detroit. He was assistant advertising manager since 1933.

♦

Alfred Marchev, works manager and chief engineer, Signode Steel Strapping Co., Chicago, has been elected a director, replacing H. C. Porter, resigned.

♦

Richard L. Gridley has resigned as financial editor, *Pittsburgh Press*, to join the public relations department, Pittsburgh Plate Glass Co., Pittsburgh.

♦

David D. Moffat, vice president, Utah Copper Co., Salt Lake City, Utah, has been elected chairman, western division, American Mining congress.

♦

J. L. Fife, of Seminole, Okla., secretary of the Oklahoma Waste Trade Association Inc., has been elected mayor of the city of Seminole.

♦

Joseph A. Martz, formerly an account executive with the Buchen Co., Chicago, is now engaged in customer relations and research work for Studebaker Corp., South Bend, Ind.

♦

A. G. C. Quay has been appointed Cleveland district representative, Moltrup Steel Products Co., Beaver Falls, Pa., in charge of the company's new office at 1199 Union Commerce building, Cleveland.

♦

A. D. Sheere has been named manager, Houston, Tex., division, A. M. Byers Co., Pittsburgh. He formerly was located in Atlanta, Ga., as as-

Charles J. Stilwell

Clifford S. Stilwell

L. D. McDonald

sistant manager of the Pittsburgh division. W. B. Simpson, formerly sales representative in the Pittsburgh division's northern territory, has been appointed assistant division manager to succeed Mr. Sheere, with headquarters in Atlanta.

♦

J. E. Buckingham, formerly vice president, Lincoln Electric Railway Sales Co., Chicago, has been appointed vice president, Portable Plating & Equipment Co., Chicago, in charge of all railway sales.

♦

Frank L. Hayes, formerly with Chicago Hardware Foundry Co., Chicago, has joined the sales force of Michigan Smelting & Refining Co., and will be located in the company's Chicago office.

♦

Murray H. Edelman has been appointed general export sales manager, Manning, Maxwell & Moore Inc. of New York. Mr. Edelman joined the company in 1910, and the past five years was export sales manager, mill supplies division, Jersey City, N. J. All export sales have been consolidated into one department.

Murray H. Edelman

♦

J. Alfred Curtis, formerly control chemist, Basic Dolomite Inc., Maple Grove, O., has joined the staff of Battelle Memorial institute, Columbus, O. He has been assigned to the analytical laboratory.

♦

Frank B. Warren, vice president in charge of sales, Bessemer Limestone & Cement Co., Youngstown, O., has been elected a director, replacing William R. Daly, of Cleveland, who declined to be renominated.

♦

H. L. Hildenbrand, the past five years associated with the Pittsburgh office of Esterline-Angus Co., maker of recording instruments, Indianapolis, has been named representative in the New York metropolitan area.

♦

Horace C. Flannigan, senior vice president, Manufacturers Trust Co. of New York; Georges Doriot, assistant dean, Harvard Business school, and Charles E. Richardson, of Bryn Mawr, Pa., have been elected directors, McKeesport Tin Plate Co., McKeesport, Pa.

♦

Walter Erman, Erman-Howell & Co. Inc., Chicago, and Louis J. Borinstein, Indianapolis, have been appointed chairman and vice chairman, respectively, public relations committee, Institute of Scrap Iron and Steel Inc., New York.

♦

A. W. F. Green, formerly associated with the Allegheny Ludlum Steel Corp., Pittsburgh, resigned April 15 to become research metallurgist with the Pratt & Whitney Aircraft division, United Aircraft Corp., East Hartford, Conn.

♦

Donald D. Hogate, in charge of the Detroit office, General Motors' public relations department, has been transferred to the staff of William S. Knudsen, president, to develop intercity communications of the corporation. Felix Bruner, assistant in the department, succeeds Mr. Hogate.

♦

Peter J. Muller has been named group leader in charge of cost study in the industrial engineering department of Carnegie-Illinois Steel Corp.'s Gary works. Mr. Muller goes to Gary from the corporation's South works where he began as a water boy in 1917. After serving in various capacities in the blast furnace department until 1937, he was made a junior industrial engineer; a year later was appointed to the post of industrial engineer.

♦

Garrett A. Connors has been elected vice president in charge of industrial relations, Pittsburgh Steel Co., Pittsburgh. He will continue in similar capacity with Sharon Steel Corp.

New members of the executive committee of Pittsburgh Steel are: Joseph H. Carter, vice president in charge of operations and Albion Bindley, purchasing agent. Other members who will continue to serve are: Henry A. Roemer, J. H. Hillman Jr. and Theodore W. Friend.

♦

Fred T. Llewellyn, research engineer, United States Steel Corp. of Delaware, Pittsburgh, addressed the Washington section, American Welding society, April 24, on "Seventy Years in Retrospect." Mr. Llewellyn, a past president of the Welding society, expects to retire June 1 after nearly 50 years' service with the corporation. He has been active in structural steel welding developments. Born in Wales and educated at the University of London, Mr. Llewellyn came to this country in 1890, taking a position as draftsman with a Midwest steel company which later became a part of the American Bridge Co., a Steel corporation subsidiary.

♦

Harry Glaenzer, vice president in charge of engineering, Baldwin Locomotive Works, has been relieved of his duties in connection with active management of the company's Eddystone engineering office, to devote all his time to developments in the field of railway motive power. Ralph P. Johnson will be in charge at Eddystone, with the title of chief engineer. Charles F. Krauss and E. J. Hartley have been appointed assistant chief engineers.

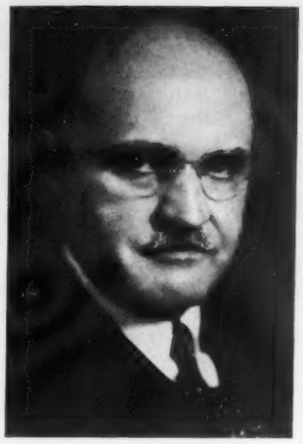
♦

John Storm has been appointed New York district sales manager, Carborundum Co., Niagara Falls, N. Y. His headquarters will be at the company's branch warehouse and sales offices, 601 West Twenty-sixth street, New York. Mr. Storm succeeds Frank J. Harrington, who has been transferred to the sales department at Niagara Falls. Mr. Storm previously had been a member of the Detroit sales staff.

John Storm

♦

F. G. Schranz, who recently was named general manager, Baldwin-Southwark Corp., has been engaged in the engineering and sales of hydraulic and special machinery 34 years. Completing his apprenticeship as a machinist and his technical training as a graduate mechanical and electrical engineer in Vienna, he started in 1904 as a machinist with the Midvale Co., Philadelphia. Subsequently he joined the Camden Iron Works of R. D. Wood & Co. as designing engineer. In 1915 he be-



F. G. Schranz

came affiliated with Southwark Foundry & Machine Co., serving as vice president in charge of sales and engineering; then as sales manager and manager for the Southwark division after Southwark was acquired by the Baldwin Locomotive Works in 1929. A year later I. P. Morris & De LaVergne Inc., and the De LaVergne Engine Co. were included with Southwark in the incorporation of Baldwin-Southwark Corp.

♦

J. R. Fenstermaker, president, Hugh J. Baker Co., Indianapolis, was elected president, Concrete Reinforcing Steel institute, Chicago, at its fifteenth annual meeting in Forest Hills hotel, Augusta, Ga., April 20-21. George W. Connors Jr., president, Conners Steel Co., Birmingham, Ala., was elected a vice president, and J. F. Curley, vice president, Concrete Steel Co., New York, and E. W. Langdon, Joseph T. Ryerson & Son Inc., Chicago, were re-elected vice president and treasurer, respectively. New directors are: Blair M. Boisseau, president, Virginia Steel Co., Richmond, Va.; H. G. Daley, president, Sweets Steel Co., Williamsport, Pa.; F. H. Sparks, Knoxville Iron Co., Knoxville, Tenn.; W. H. Stewart, manager of sales, reinforcing division, Truscon Steel Co., Youngstown, O.; H. E. Calves, vice president, Taylor-Davis Inc., Philadelphia (re-elected); Ralph T. Rowles, assistant manager of sales, Jones & Laughlin Steel Corp., Pittsburgh.

DIED:

■ CHARLES S. BOARDMAN, consulting engineer, specialty sales division, Carnegie-Illinois Steel Corp., Pittsburgh, in Pittsburgh, April 19. In 1907 Mr. Boardman invented and patented a new type of interlocking steel which was adopted by the government to raise the battleship MAINE in Havana harbor, and later was used in major construction work. He was designing and construction engineer with the Lackawanna Steel Co. in 1901 when it started to build its plant at Buffalo, and upon its completion became affiliated with Conkling & Boardman, consulting engineers. He returned to Lackawanna Steel in 1913, remained there until 1923 when he became vice president and manager of sales, Strong Steel Foundry Co., Buffalo. Prior to joining Carnegie-Illinois early in 1938 he was consulting engineer, Jones & Laughlin Steel Corp., Pittsburgh. Mr. Boardman was a member, American Society of Civil Engineers and Engineers' Society of Western Pennsylvania.

♦

Horace Andrews, 77, well-known corporation lawyer, in Cleveland Heights, O., April 27. He was senior partner in the firm of Andrews, Hadden & Putnam, a veteran of more than 40 years legal practice in Cleveland. He was counsel for Pickands, Mather & Co., Cleveland-Cliffs Iron Co., M. A. Hanna Co., and many other companies identified with the iron and steel industry.

♦

William A. Baker, 63, vice president and sales manager, American Electrical Heater Co., Detroit, in that city, April 20.

♦

Chester T. Ayres, 65, executive treasurer, Union Carbide & Carbon Corp., New York, April 6 in Montclair, N. J.

♦

Howard Ross Warren, for 30 years treasurer, Sheffield Steel Corp., Kansas City, Mo., at his home in that city, April 19.

♦

H. C. Herpel, 57, manager of industrial relations, National Tube Co. at McKeesport Pa., in McKeesport, recently.

♦

Robert A. Flanagan, 46, manager, Philadelphia branch of Lansing Co., Lansing, Mich., in Brookline, Pa., April 11. He had been with the Lansing company in various capacities since 1908.

♦

W. H. Jackson, 71, president, Pittsburgh-Des Moines Steel Co., Pittsburgh, in that city, recently. Born in Delaware, O., Mr. Jackson went to Pittsburgh about 30 years ago, and had been president of Pittsburgh-Des Moines 17 years.

♦

J. A. Roesch Jr., 55, president, Steel Sales Corp., metal jobbing firm, Chicago, in Pittsburgh, April 27. Well known in the steel industry, Mr. Roesch was also a director, Copperweld Steel Co., Glassport, Pa., since its formation in 1917.

Activities of Steel Users, Makers

■ SUTTON Engineering Co., Bellefonte, Pa., recently demonstrated to a large group new units it has developed for use in descaling, sizing, straightening and polishing work. Descaling machine obtained good results with a mixture of carborundum and stainless steel grindings as the abrasive. During tests, 1 11/16-inch rounds were held to 0.002-inch plus or minus as to size and straightness.

♦

Consolidation of Speeder Machinery Corp., Cedar Rapids, Iowa, manufacturer of excavating and materials handling equipment, and the shovel division of Link-Belt Co., Chicago, has been announced by Alfred Kauffmann, president, Link-Belt. Speeder Machinery Corp. will be operated as a Link-Belt subsidiary, with the present management in charge, T. M. Deal continuing as president.

♦

H. H. Robertson Co., Pittsburgh, has moved its executive, general sales and Pittsburgh sales offices from the Grant building to the twenty-fourth floor of the Farmers Bank building in Pittsburgh. All other departments, connected with production, were moved to the company's new office building at its plant in Ambridge, Pa.

♦

Wm. B. Scaife & Sons Co., Pittsburgh, has established an industrial fellowship at Mellon institute, Pittsburgh, for research in processes of fabricating and use of metal tanks, pressure cylinders and water-softening equipment. Dr. H. L. Anthony III is incumbent of the fellowship.

♦

Wickwire Spencer Steel Co. has opened its new $500,000 wire mill on River road, Buffalo, with operations on a restricted basis. Capacity operations will not be possible for six months or a year.

The company's plant in Worcester, Mass., will be closed and employes and machinery transferred to the new 399 x 500-foot building in Buffalo. Products will include fencing, highways reinforcements, wire fabrics.

♦

Schiavone-Bonomo Corp., Jersey City, N. J., dealer in scrap, marked its fortieth year in business April 24 by occupying its new office building at the foot of Jersey avenue. All office and administrative departments, formerly divided between New York and Jersey City, will be centralized.

Open Hearth, Blast Furnace Groups Seek Better Operating Practices

■ ALL RECORDS for attendance were broken at the national conference of the Open Hearth, and Blast Furnace and Raw Materials committees, American Institute of Mining and Metallurgical Engineers, at Hotel Cleveland, April 26-28. The open-hearth group was represented with more than 365 members, including 80 open-hearth superintendents and their assistants and 50 metallurgists; the blast furnace group totaled more than 100.

Except for one joint session, the two committees conducted separate meetings. Leo F. Reinartz, manager Middletown district, American Rolling Mill Co., Middletown, O., is chairman of the Open Hearth committee; and Ralph H. Sweetser, consulting engineer, New York, is chairman of the Blast Furnace and Raw Materials committee. The two groups also participated jointly in a visit to the 98-inch continuous strip mill of Republic Steel Corp. on April 27, and in a dinner in the evening.

Mr. Reinartz announced the serious illness of F. B. McKune, superintendent of open hearths, Steel Co. of Canada Ltd., Hamilton, Ont.—a steelmaker held in high esteem both in this country and Canada.

Chairman Reinartz also reported that two questionnaires had been sent to various steel companies this year, one dealing with burners for oil and natural gas fired furnaces, and the other with standardization of men's blue glasses. Replies indicate that a good cross section of the steel industry has been obtained.

Procedure in Grievances

Speaking on "Settling of Grievances," R. A. Chaffin, director of industrial relations, Continental Steel Corp., Kokomo, Ind., emphasized importance of avoiding grievances. Practically all grievances are simple matters in the first stages, he contended, and if proper methods of investigation and correction are used, few which will advance to troublesome proportions. The speaker advocated proper training and instruction for supervisors, including the lower groups. The latter should be taught to investigate thoroughly and without prejudice all complaints and to withhold decisions until they are positive of their answers.

Experience has convinced the speaker that how the company deals with a problem often is more important than what it actually does. In the author's opinion, it is a good plan to have frequent sessions for foremen where they may discuss problems which may be divided into several sub-topics. Foremen are asked to prepare short papers on these topics and then considerable time is devoted to open discussion on the main subject, the sub-topics, and statements made by persons who compiled the papers. Speakers for the meeting are considered authorities on their subjects and are given an opportunity to answer questions resulting from discussion.

Must Maintain Confidence

Complete information, including complaint and investigation reports should be made in writing and signed. This, he stated, will usually provide proper basis for fair conclusions. Signed reports should not be shown to other people, the speaker warned, nor disclosed by the investigator.

In conclusion, Mr. Chaffin stressed the following fundamentals on the handling of grievances: Do everything possible to find and correct objectionable conditions before they are brought to attention by collective bargaining machinery; provide supervisory agents with proper information regarding company policy and with proper training in methods of discussing complaints with employes; be certain answers are not given hastily; impress supervisors with importance of properly settling complaints at their source; consider the advantages of having supervisors delay positive answers to complaints for at least a few hours so that they may check their original convictions and decide the type of explanation and reasoning which will be most satisfactorily accepted by those who have made the complaint; avoid unnecessary delay in either correcting a condition about which a complaint has been raised, or in presenting satisfactory explanation of reasons for delay or refusal; reduce to writing as completely as possible all reports and agreements; try to view the complete facts regarding a complaint in the same manner an impartial agent would see them and make the decision which he might be expected to give.

An operator in the Chicago district pointed out that his plant is divided into 20 sections, the open-hearth department having two delegates. If employes have a grievance, they take it to these two delegates and if the latter cannot arrive at a settlement, then the grievance is taken to the foreman. If the foreman and degelates cannot come to a settlement, the grievance is taken to the department superintendent. In case there is still no settlement, the matter is taken to the superintendent of industrial relations, thence to the board of adjustment comprising six delegates who meet with the general superintendent of the plant for settlement. Many of the grievances, he stated, never get to the highest body.

At a plant in the Pittsburgh district identified with the CIO complaints arising in the open-hearth department are brought to the foreman in writing. If a settlement cannot be made, the grievance is taken to the open-hearth superintendent, then passed to the superintendent of industrial relations and finally to the works manager.

At another plant, all grievances are dealt with through regular channels. Monthly meetings are held with the CIO, discussion being confined to those grievances which can not be settled by department heads.

Reduction Made In Slag Volume

Solution loss, slag volumes and operating practice were discussed at sessions of the Blast Furnace and Raw Materials sessions. Dealing with the slag problem as handled at South works, Carnegie-Illinois Steel Corp., Chicago, G. E. Steudel, division superintendent of blast furnaces, pointed out that optimum slag above the tuyeres may not be the same as below the tuyeres. Thus a compromise usually is necessary. In a detailed study of slag chemistry, he emphasized the great influence this factor exerts on slag action. For instance, a variation of only 2 per cent in silica content may produce a 200-degree Cent. difference in the melting point of the slag, an important feature.

Mr. Steudel recommended reducing slag volume to increase alumina content. This, in turn, makes the melting temperature less sensitive to variations in chemical composition. About 16 per cent alumina is used here compared with the usual 11 to 14 per cent. They have successfully reduced the volume of slag in tests to 778 pounds in basic furnaces where 1050 was lowest previously made. In bessemer practice, 730 pounds was obtained where the previous minimum was 950.

These reduced volumes were accompanied by significant reductions in coke consumption. In basic practice, it was found that this coke re-

duction averaged about 50 pounds per ton of metal produced for each 100 pounds of slag volume that was eliminated. During this time, a high-quality product was being obtained consistently with not over 0.050 per cent sulphur. It was found that slower furnace swings resulted, making possible better furnace control. All these tests were run while metal requirements necessitated wide burden and wind changes. Furnace movement was not hindered at any time, it was found. Sulphur absorption by slag increased by 20 per cent and it was thought the limit then had not been reached.

Advantages of this practice include reduced slag for disposal, lower coke consumption, less flue dust, low blowing engine pressures and a more uniform product. Mr. Steudel said a previous objection to low slag volumes, the burning of tuyeres, was not encountered as no increase in loss from this cause was experienced.

Procedure Not a Cure-all

In subsequent discussion it was pointed out that high alumina no doubt helps but cannot be considered a cure-all as action depends not only on effect of alumina but also on other parts of the burden.

P. V. Martin, assistant superintendent blast furnaces, Carnegie-Illinois Steel Corp., Chicago, presented a most interesting and detailed discussion of heat balances obtained with various reduction methods and compared conclusions of previous investigators with those obtained by modern methods of attacking the problem. It was shown how direct reduction possibly had the greatest efficiency, at the same time reducing carbon consumption. The main conclusion was that carbon efficiency is promoted by direct reduction. He also pointed out that blast heat reduces carbon requirements to a greater degree than would be indicated by added heat content of the blast due to interlocking chemical and thermal reactions.

Discussion brought out that some operators had found best coke practice was obtained at relatively low blast temperatures while others were using temperatures up to 1700 degrees Fahr. and contemplating use of 1800. Referring to direct reduction, one commentator substantiated the conclusion that a certain amount of direct reduction was essential for a low coke rate. It was thought each furnace strikes a balance as to proportion of direct reduction it will maintain, this being increased by correct type of coke, uniform flow of material to bosh, proper peripherial distribution of the gas stream.

A paper contributed by J. A. L. Ortlepp, African Metals Corp., Johannesburg, Africa, suggested dividing blast furnace operations up into separate parts, believing that added economy could be obtained by producing a partial reduction in equipment outside the blast furnace. He advocates use of combined sintering and calcining equipment ahead of the blast furnace, the output of this equipment being discharged while still hot into the modified blast furnace. Advantages claimed include halving coke cost—by lowering the CO ratio, saving 64 pounds; pre-reduction of 90 per cent of iron oxide outside the furnace, saving 361 pounds; external calcination of fluxes, saving 81 pounds. Other advantages are said to be easy chemical control of process and elimination of much blast furnace trouble.

However, in the discussion following this paper, it was pointed out that the total fuel consumption was not reduced but that simply other cheaper fuels were substituted for coke. Much doubt was expressed as to reaction velocity being sufficiently high to afford commercial operation of such an arrangement. Also, the influence of solution loss, instead of increasing CO ratio, may actually decrease it because of added reactions occurring after the CO is formed.

Savings May Be Reduced

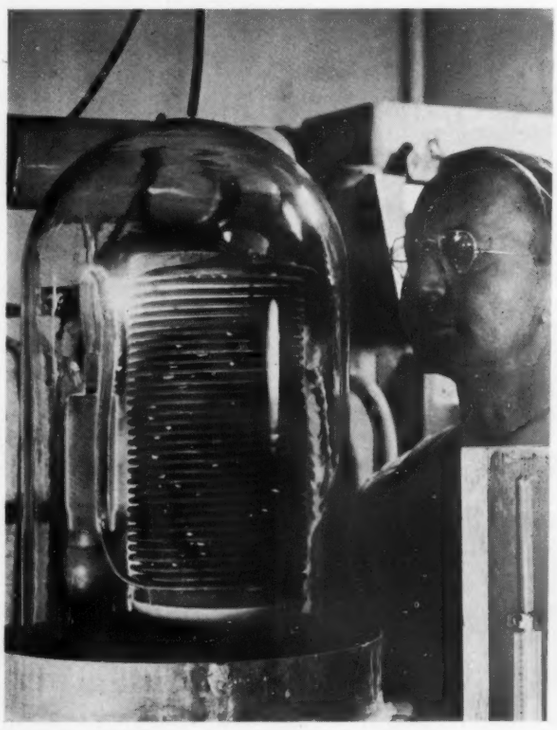
Other commentators saw no point in cutting the blast furnace in two, especially as any other arrangement must at least equal the high thermal and chemical efficiency of the blast furnace. Added handling costs also may offset any saving in fuel cost.

A paper contributed by Alfred Musso, consulting engineer, New York, described a low-temperature vacuum reduction process. Instead of pressure to hurry up reduction, he advocates use of a vacuum, advantages claimed being increased speed of reduction, elimination of undesirable gases and vapors which lead to objectionable secondary reactions in usual reduction methods. Operations involve heating the ore to a temperature of 1800 degrees Fahr. in a sealed chamber where it mechanically contacts carbon. This is followed by separation in an alkaline bath, also under a vacuum. He claims 99.5 per cent reduction with precise control and only 40 per cent of usual fuel consumption.

Discussion emphasized that these claims were based on highly theoretical studies with no practical plant in operation to demonstrate. Probable extremely slow speed of reaction was thought to preclude commercial operation. Also doubt was expressed at practicability of transferring such high heat values through the walls of a chamber.

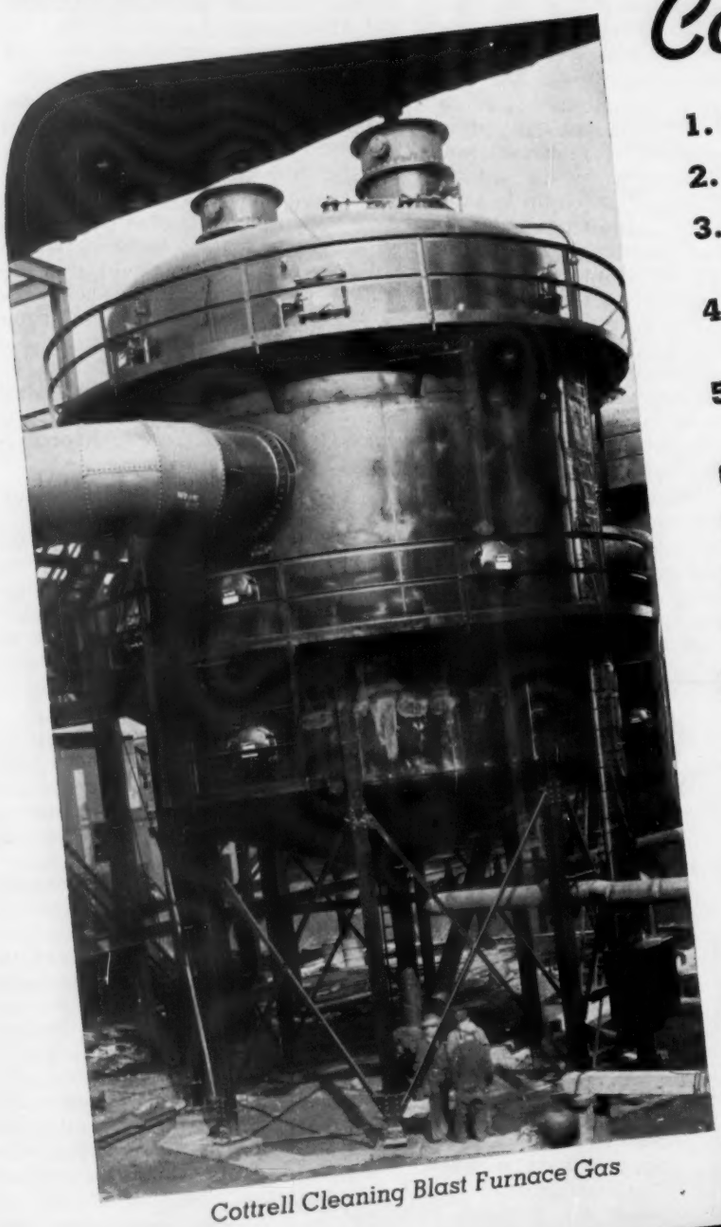
A resume of other sessions will appear in STEEL next week.

Iron—99.99 Per Cent Pure



■ **Iron, 99.99 per cent pure and containing only one-thousandth of 1 per cent carbon, is produced under direction of Dr. T. D. Yensen, Westinghouse research laboratories, East Pittsburgh, Pa. One hundred times as costly as ordinary iron, annual world consumption does not exceed 1000 pounds, which can be produced in less than a week. The metal is used as a laboratory yardstick in analyzing other elements. Photo shows Dr. Yensen watching his high frequency induction furnace. Carbon and oxygen from the heated iron are drawn off by means of a vacuum system**

ONE DAY'S WORK FOR COTTRELLS



Cottrell Cleaning Blast Furnace Gas

Collecting

1. 120 tons of fly ash at a power plant.
2. 6 tons of soda salts at a paper mill.
3. 55 tons of smelter dust containing 20 percent copper.
4. 13 tons of sodium sulphate at 92 per-cent content.
5. 3 tons of antimony dust from a silver refinery.
6. 208 tons of 12 percent copper dust.
7. 1100 pounds of mercury dust.
8. 10 tons of arsenic.
9. 3 tons of tar at a gas plant.
10. 12,000 pounds of blast furnace dust fine cleaning.
11. 4½ tons of alumina.
12. 5500 pounds of concentrated sulphuric acid.
13. 220 tons of cement dust.
14. 20 tons of roaster dust.

These DAILY savings of values soon pay for Cottrell installations. You can get similar benefits in the collection of any kind of dust, fog, fume or mist or any kind of dust nuisance elimination.

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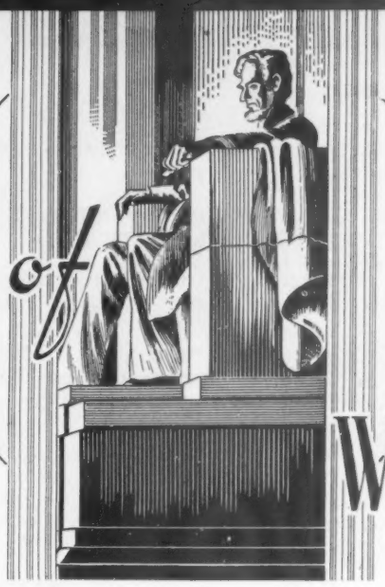
PIONEERS IN DUST AND FUME CONTROL

Windows of WASHINGTON



By L. M. LAMM
Washington Editor, STEEL

WASHINGTON

■ HOUSE last week passed the war materials bill, including an amendment giving American producers preference in reserve stocks. Despite administration objections to spending $25,000,000 a year for stockpiles for four years, the bill, as it passed the house, provides for the expenditure of $100,000,000 over the 4-year period.

The bill passed by the senate provided for expenditure of only $10,000,000 a year for four years, or a total of $40,000,000.

The senate will decide on Monday whether to accept the bill as it passed the house or to send it to conference. It has been indicated that if the bill goes to the President providing for expenditure of $100,000,000 it may be vetoed.

House bill also provided $2,000,000 for investigations of new deposits, new methods of extracting low-grade ores and substitutes.

Signs Defense Appropriation

The President last week signed the $549,000,000 appropriation bill for army defense activities for the coming fiscal year beginning July 1.

Of the total, approximately $66,000,000 will go for purchase of about 800 modern fighting planes, while some $53,000,000 will be spent for semiautomatic rifles, tanks and antiaircraft guns. As the bill was finally sent to the President, it carried some $7,000,000 less than the sum recommended by the war department, but $53,000,000 more than the similar appropriation for the current year.

The President has sent a supplemental estimate to congress for the war department, asking for an appropriation of $6,000,000 to provide for the procurement and installation of "machinery for the rehabilitation of manufacturing arsenals of the ordnance department of the army." This estimate is supplemental to the army budget for the fiscal year of 1940. The request of the war department for this additional $6,000,000 for the purchase of machinery has been approved by both the President and the bureau of the budget.

SOUTHERN ORDNANCE PLANT TO BE PARTIALLY REOPENED

Navy has ordered partial reopening of its $25,000,000 World war ordnance plant at South Charleston, W. Va., to speed warship construction.

A small part of the long-idle plant, consisting of a few heating furnaces installed in one building, the navy said, will be leased to the Carnegie-Illinois Steel Corp., to accelerate delivery of light-weight, heat-treated plates. The plates, officials explained, are used in construction and are not armor plates.

The plates will be rolled at the company's Homestead, Pa., works, shipped to South Charleston for the heat treatment, and then returned for finishing.

The West Virginia ordnance plant, hurriedly established in the World war, has not been used for almost 20 years. Under administration plans to make available sufficient mechanics for the projected vast expansion of air forces, a portion of the plant and also the long-idle New Orleans navy yard are to be used by the national youth administration.

STUDY SHOWS NEED FOR FEDERAL TAX REVISION

Federal tax system should be drastically overhauled, according to a report made by the Brookings institution, a nongovernmental organization in Washington. The conclusions were contained in a report made for the institution by Dr. James D. Magee of New York university.

The institution suggested abolition of the tax on intercorporate dividends, substantial reduction of surtax rates on incomes in the higher brackets, abolition of the tax on undistributed profits, elimination of the normal income tax on corporate dividends, and disregard of capital gains and losses in computing taxes on corporation income. The report contends that existing tax levies are choking the flow of private funds into investment channels.

Dr. Magee said the report had not attempted to estimate the amount of revenue that would be lost from the suggested changes or to suggest other taxes to make up the deficiency. But, he added, "it is our view that even if there should be, immediately speaking, a considerable net reduction in tax revenues, the gains resulting from the stimulus to the expansion of private enterprise would, in the near future, much more than offset the probable revenue losses."

The tax situation on Capitol Hill is in a muddled condition. Treasury department officials are contending the ways and means committee of the house, which originates tax legislation in congress, has not asked them to appear in connection with tax changes; committee members say treasury department experts could appear any time.

PRESIDENT PROPOSES REORGANIZATION PLAN

President Roosevelt last week sent to the senate the first of three government reorganization plans. This week he will transmit two additional reorganization plans, one of which he called an interdepartmental plan and the other an intradepartmental plan.

Under the plan submitted last week, a number of independent organizations would be grouped under three new agencies to be known as federal security, federal works and federal loan. The President estimates a $20,000,000 annual saving in administrative costs.

Component parts of the three new

agencies are set forth in the order as follows:

Federal security agency: Social security board, now independent; United States employment service, now in labor department; public health service, now in treasury; national youth administration, now a part of WPA; and civilian conservation corps.

Federal works agency: Bureau of public roads, now in agriculture department; public buildings, branch of the treasury's procurement division; building management, branch of the national park service (in relation to buildings it operates for other departments); United States housing authority, now in interior; public works administration, now in interior. WPA, now independent, is transferred to the new agency, but with its identity retained for the time being under the title of work projects administration. It would be a subordinate unit of the works agency.

Federal loan agency: Reconstruction finance corporation, electric home and farm authority, federal home loan bank board, federal housing administration, and associated agencies and boards, including the export-import bank of Washington.

Other independent lending agencies set up since 1916 are transferred to the agriculture department because, the President explained, they deal directly with that phase of government. These are: Farm credit administration, Federal Farm Mortgage Corp., and Commodity Credit Corp.

Agencies that would go under the direct supervision of the executive are: Budget bureau, from the treasury department; central statistical board, made a part of the budget bureau; national resources committee, now independent; federal employment stabilization office, taken from commerce department and made part of the resources committee, with its name changed to national resources planning board.

LEON HENDERSON NAMED TO SUCCEED DOUGLAS ON SEC

President Roosevelt has nominated Leon Henderson, executive secretary of the temporary national economic committee, to succeed William O. Douglas as member of the securities and exchange commission.

Mr. Henderson, native of New Jersey, is 44 years old and is known in Washington as one of the leading left-wing New Deal economists. He is particularly close to Secretary of Commerce Hopkins and Secretary of Interior Ickes, was one of the economic advisers of the NRA, having come to Washington in 1934 to accept that position. He has been secretary of the TNEC since its organization last year.

HOUSE COMMITTEE APPROVES MACHINE TOOL TRADE-INS

Favorable report has been made to the house by the military affairs committee on H.R.-3587, providing "the secretary of war be, and is hereby, authorized to exchange obsolete, unsuitable, and unserviceable machines and tools, and parts thereof, pertaining to the manufacture or repair of ordnance *materiel* for use in the national defense, for new machines and tools of the same or equivalent general character." This bill is identical with one now on the senate calendar.

LEISERSON NOMINATED TO LABOR RELATIONS BOARD

American Federation of Labor won a victory last week when the President sent to the senate the nomination of Dr. William M. Leiserson, Ohio, as a member of the national labor relations board to succeed Donald Wakefield Smith, who is now serving a recess appointment.

Considerable controversy has raged about Mr. Smith because of his alleged radical views, not only from industrialists but from the AFL. Dr. Leiserson is chairman of the national mediation board which has jurisdiction over railway labor problems, having been appointed to that position for a 5-year term from August, 1938.

REPORTS FAVORABLY ON TIN BILL AMENDMENT

House military affairs committee has reported favorably on a bill to amend the 1936 act protecting domestic tin sources. Amendment would prohibit the exportation of "other scrap drosses, or residues, the tin content of which is in excess of 10 per cent, in which the copper content does not exceed the tin content."

Said the committee:

"Tin is one of the metals most widely used in this nation and is essential to our economic life during peacetime or war. We normally consume about 60,000 tons of virgin tin and produce none. We do have, however, a domestic detinning industry which recovers tin to the amount of as high as 25 per cent of our importations of virgin tin. This recovery is partly from tin scrap but mostly from junk tin and drosses. This tin recovered from junk is used in bearings and commodities other than tin plate. It relieves the drain on the supply of virgin tin. The industry engaged in recovering tin acts in the manner of a reserve supply in case this nation should be cut off from importing tin from abroad.

"At the present time foreign interests are draining this nation of valuable sources of tin in junk tin and the recovery industry is threatened with destruction because of a dearth of material. This bill, if enacted into law, would place an embargo upon the exportation of scraps, drosses, or residues, the tin content of which is in excess of 10 per cent, in which the copper content does not exceed the tin content. Exception is by permit issued by the secretary of war."

WAR DEPARTMENT PLACES FIRST EDUCATIONAL ORDERS

War department has announced award to six manufacturers of the first educational orders, and the last which will be placed this fiscal year.

The present session of congress has authorized the expenditure of an additional $32,500,000 for educational orders after July 1 next, but the actual appropriation has not yet been made.

American Forge Co. was granted an award for 75 mm shell forgings; S. A. Woods Machine Co. for machining 75 mm shells; Goodyear Tire & Rubber Co. for gas masks; Winchester Repeating Arms Co. for new semiautomatic rifles; General Electric Co. for searchlights for antiaircraft artillery; and R. Hoe & Co. for recoil mechanism of the antiaircraft guns. All of these awards were made without the normal requirement of competitive bidding.

The war department in announcing these awards said the orders are merely a beginning of possibly 60 or 70 critical items having no commercial counterparts and covering the field of gas defense, communications, and fire control equipment; military airplanes and their accessories; small arms, artillery, ammunition, and combat vehicles.

GOVERNMENT IRON, STEEL AWARDS TOTAL $510,973

During the week ended April 22, the government purchased $510,973.18 worth of iron, steel and their products under the Walsh-Healey act, as follows: National Tube Co., Washington, $59,580.60; Erie Forge Co., Erie, Pa., $59,025; Ceco Steel Products Corp., Jersey City, N. J., $12,458; Edward G. Budd Mfg. Co., Philadelphia, $124,012.96; Bethlehem Steel Co., San Francisco, $134,263; Carnegie-Illinois Steel Corp., Washington, $35,490 (estimated); Youngstown Sheet & Tube Co., Youngstown, O., $23,290 (estimated); Wire Rope Corp. of America Inc., New Haven, Conn., $12,354; Morse Chain Co., Ithaca, N. Y., $13,380; Joseph T. Ryerson & Son Inc., Chicago, $14,257.62; Steel Construction Co., Portland, Oreg., $22,862.

AVIATION

LAUNCH TRAINING PROGRAMS TO MEET LABOR SHORTAGE

■ ACUTE shortage of skilled labor today confronts the various branches of America's rapidly growing aeronautical industry.

As their factories steadily expand, the aircraft builders are finding it more difficult to man production lines. Firms in the Los Angeles area alone are said to be requiring 150 additional men daily. Total shop employment now approximates 50,000, compared with 40,000 three months ago.

Necessarily strict are qualifications for workers in this industry. Reports a large eastern manufacturer: "On some days we interview as many as 1200. Of this number it is rare that more than 40 are qualified."

Previous experience sometimes proves a handicap. One company finds the ordinary sheetmetal worker very often lacks the skill and precision required for aircraft materials.

Nearly all important airplane makers are resorting to their own training programs. These include apprentice systems, foreman training courses, plant lectures and extension classes in engineering schools.

Air transport companies need more well-trained mechanics. American Airlines recently inaugurated an apprentice school to meet its requirements.

The scheduled expansion of military aviation will necessitate large-scale personnel increases. Army air corps plans to train 16,000 mechanics, boost its annual quota of cadet flyers to 2000. Allied is the project for training 20,000 student aviators annually.

The air corps expansion program got underway last week when warplane contracts totaling more than $50,000,000 were released following President Roosevelt's signing the $549,000,000 war department supply bill. Orders for 571 planes, including four-engined bombers, pursuit, interceptor and observation craft, went to five builders. This is the largest aircraft award in air corps history.

Award Contracts for Parts

Bids for attack-bombers opened by the army ranged from $1,225,000 for a single ship to $48,951 in lots of 1000. The army has awarded accessory contracts to: Wright Aeronautical Corp., Paterson, N. J., exhaust manifolds and parts, $162,263; Keuffel & Esser Co., Hoboken, N. J., drift meters, $129,950; and Curtiss-Wright Corp., New York, propellers and hubs, $94,627.

Grumman Aircraft Engineering Corp., Bethpage, L. I., has booked two navy department orders, $1,096,476 and $466,367, for airplanes and parts. Other recent navy awards: B. G. Corp., New York, spark plugs, $57,984; and American Brass Co., Waterbury, Conn., aircraft tubing, $33,134.

Ryan Aeronautical Co., San Diego, has received an order from the Chinese nationalist government for all-metal training planes costing between $750,000 and $1,000,000. Royal Dutch Airlines last week ordered a DC-3 21-passenger transport costing $120,000 from Douglas Aircraft Co. Inc., Santa Monica, Calif.

Contracts will soon be let by Northwest Airlines Inc., St. Paul, for six Douglas DC-3 planes costing $720,000; six engines, $73,800; and radio equipment, propellers and parts, $64,100. Purchase is to be partially financed with an RFC loan.

Howard Aircraft Corp., Chicago, proposes to construct a one-story, 120 x 550-foot plant to cost $150,000.

Thomas Gassner Co. Inc., Philadelphia, builder of metalworking machinery for the last 100 years, has entered production of aircraft parts. Its first order, from Bell Aircraft, was for gear boxes.

Plans for new all-metal transport planes are announced by Lockheed Aircraft and Douglas Aircraft. Lockheed will build a 13-ton, four-engined, 28-passenger airliner, known as the "Excalibur"; and a 5½-ton, twin-engined "Electra 16-E." Douglas intends to add a new DC-6 four-engined craft.

Flush-Type Rivets Used in New Bomber

■ **Now undergoing army tests, this new all-metal Stearman X-100 attack-bomber combines high speed and large bomb load capacity. Carrying crew of four, it weighs 9 tons. Construction is featured by use of flush-type rivets on all exterior surfaces to decrease drag, and wide transparent panels in the nose to improve visibility**

Gray Iron Founders Nominate Directors

■ Gray Iron Founders' Society Inc. will elect directors at its annual meeting, May 15, Netherland-Plaza hotel, Cincinnati. Nominees are:

THREE-YEAR TERM (1939-1942)

C. R. CULLING, vice president, Carondelet Foundry Co., St. Louis.

A. L. KATELMAN, manager, Katelman Foundry & Mfg. Co., Council Bluffs, Iowa.

S. C. MEFFORD, treasurer, Auburn Foundry Inc., Auburn, Ind.

C. J. MILLER, president, Fremont Foundry Co., Fremont, O.

R. D. PHELPS, president, Francis & Nygren Foundry Co., Chicago.

PETER E. RENTSCHLER, president, Hamilton Foundry & Machine Co., Hamilton, O.

ONE-YEAR TERM (1939-1940)

D. A. CULLINAN, president, Western Foundry Co., Chicago.

T. I. CURTIN, president, Waltham Foundry Co., Waltham, Mass.

A. C. DENISON, president, Fulton Foundry & Machine Co., Cleveland.

WILLIAM J. GREDE, president, Liberty Foundry Inc., Wauwatosa, Wis.

R. E. KUCHER, vice president, Olympic Foundry Co., Seattle.

HUGH MARTIN, president, Detroit Gray Iron Foundry Co., Detroit.

W. F. MOSSER, secretary-treasurer, W. F. Mosser & Son, Allentown, Pa.

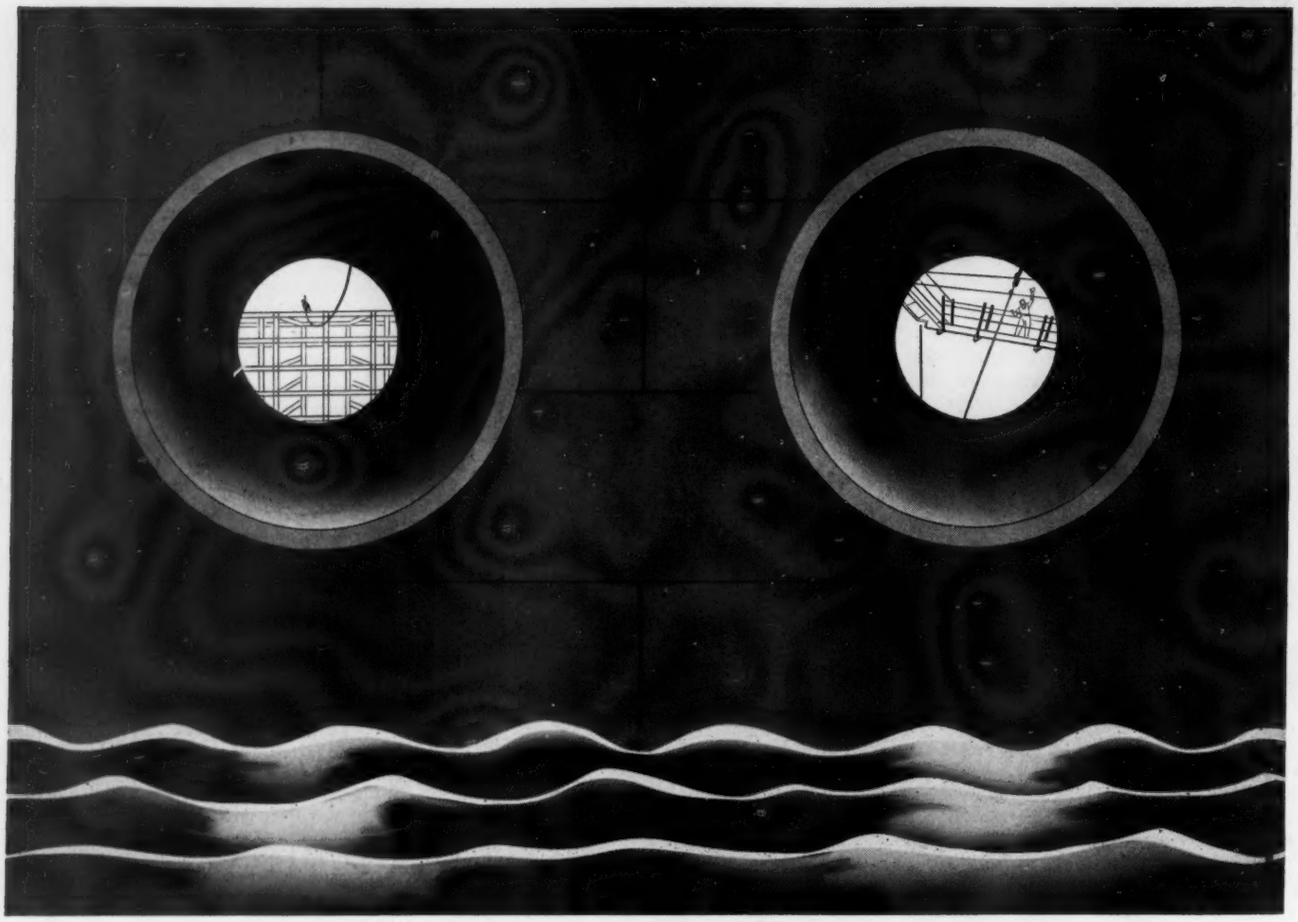
J. H. POHLMAN, president, Pohlman Foundry Co. Inc., Buffalo.

R. J. REDMOND, secretary-treasurer, Buckeye Foundry Co., Cincinnati.

A. J. RUMELY SR., president, LaPorte Foundry Co., LaPorte, Ind.

W. L. SEELBACH, secretary-treasurer, Forest City Foundries Co., Cleveland.

EDGAR SPENCER, treasurer, Philbrick-Booth & Spencer Co., Hartford, Conn.



A CAST IRON THAT CUTS COSTS

Especially tough service requirements need not call for expensive alloy combinations. Often a less costly, but judiciously chosen, material will do the work.

Such was the case with castings for reservoir discharge nozzles and lock-gate valves. Physical specifications called for 55,000—65,000 p.s.i. tensile strength, 5,300—6000 lb. transverse strength (12" centers), 220-240 Brinell hardness.

All this plus the ability to withstand the corrosion of water containing sulphuric acid from mine drainage.

Copper-Molybdenum iron containing 0.80 — 1.00% Copper and 0.30 — .40% Molybdenum met all the requirements of strength, hardness and acid resistance. The lock-gate valves have been in service 2½ years without noticeable signs of corrosion or erosion.

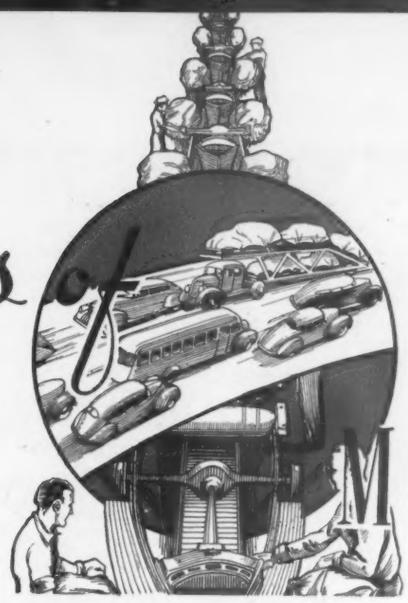
Investigation may show where you, too, can apply Molybdenum iron to advantage. Our technical book "Molybdenum in Cast Iron" which contains wealth of practical data, will be sent free on request to interested production executives and employees.

PRODUCERS OF MOLYBDENUM BRIQUETTES, FERRO-MOLYBDENUM, AND CALCIUM MOLYBDATE

Climax Mo-lyb-den-um Company
500 Fifth Avenue · New York City

MOLY

Mirrors of MOTORDOM



By A. H. ALLEN
Detroit Editor, STEEL

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DETROIT

■ REVOLUTIONARY changes in motor designs are forecast in the next few years by experimental work now in process hereabouts. Power plants for automobiles, aircraft and even marine craft are all likely to benefit from the improvements made possible by these new designs, some of which have been under development for over ten years.

Two factors lately have spurred research to the point where commercial manufacture of some of these engines is considered only a matter of months. One is the perfection of a new high-octane (100) gasoline permitting still higher compression ratios, and the other is the wave of activity in aircraft construction, in turn occasioned by a real or fancied national defense problem.

It is still a little early to give complete details of these new engines, but a sketchy discussion of salient points will suggest what is in store. One type is a so-called "barrel" engine and is a combination of the radial and in-line principles of construction with some 20 cylinders in the unit.

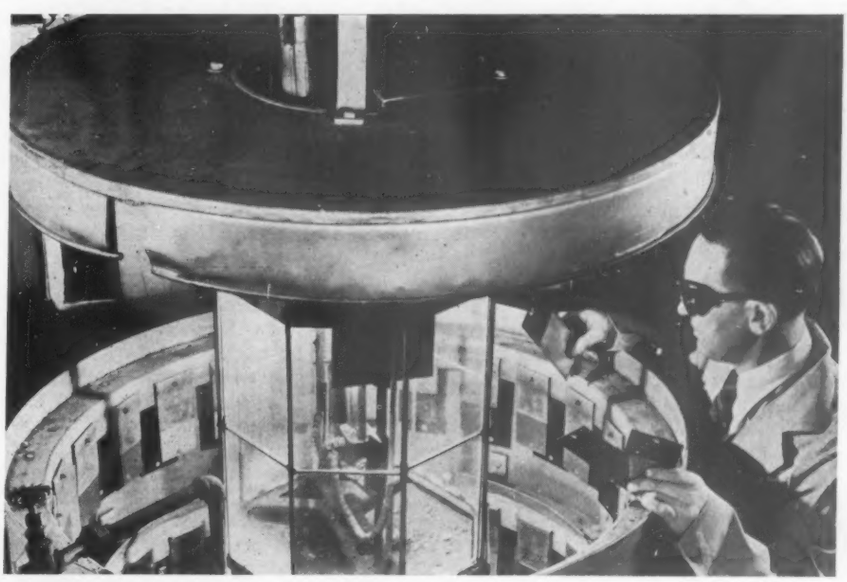
Another is designed with an overhead crankshaft and inverted pistons, with smaller crankshafts geared or chained to the main shaft driving split-sleeve valves somewhat similar to those used on the Knight engines. With the inverted design, lubrication problems are simplified, need for crankcase ventilation being dissipated, of course, and sleeve valves permit higher speeds, more positive valve action, more horsepower per cubic inch displacement, lighter overall weight and other advantages. This design is understood to have gone into the preliminary production phase, with 30 of the engines scheduled to be built under sponsorship of one of the "big three".

The split-sleeve valve principle is the feature of a third line of engines, and has been adapted successfully to in-line engines, aircraft radials, diesels, large marine engines and other units. The sleeves are in the form of half cylinders fitting between the block and an inner sleeve in which the piston travels. Exhaust and inlet ports are opened and closed by up and down movement of the sleeves which are actuated by separate crankshafts geared to the main crankshaft, and no springs are required in the valve operation.

The latter development has great possibilities in the aircraft engine field, and one of the large automobile companies already has taken steps leading to eventual manufacture of such a line of engines.

Other engine developments include new activity on a small engine by Ford, the new two-cylinder two-cycle engine used in the Cros-

Artificial Sun and Rain Test Auto Finishes



■ **Man-made sunshine, developed by a carbon arc lamp, tests the durability of car finishes for De Soto in this fadometer used at the Chrysler Corp. engineering laboratories. The drum containing the paint panels revolves once every two hours to insure uniformity of exposure, while water is sprayed on the panels for 15 minutes of every two-hour period to simulate rainy weather conditions. This equipment is used in conjunction with outdoor paint proving grounds operated by the corporation in Florida**

ley car unveiled at Indianapolis last Friday, new aircraft engines developed by Continental Motors Inc., and some others which have not yet attained much stature.

Automobile company engineers are recognizing the continued trend toward higher speeds and higher compression ratios, and they realize that gradually the limits are being reached on satisfactory operation of poppet valves. Perhaps as early as 1941 models the adoption of sleeve-valve engines will be at hand.

Some of these new designs, by the way, are ideally adapted to the use of welded rolled steel construction and it is not at all impossible that this type of engine block may be perfected for automotive engines in the interests of reducing dead weight. Some engineers are of the opinion welded rolled steel is easier to fabricate than aluminum alloys and can be used to build an engine that is just as light as an aluminum design with equivalent strength.

At the same time it is likely nitrided steel sleeves for valves on this type of engine will be successful. Work which Ford engineers have done in the direction of developing thin-gage nitrided steel cylinder liners, formed from material as light as fender stock, is blazing a trail for economical manufacture of valve sleeves.

New engine designs usually are perfected years in advance of their appearance on production models. Often their initial appearance in service is made secretly in cars entered in the 500-mile Memorial day race at Indianapolis. One of the first Ford V-8s was tested in this way, and it is reported around Detroit that if you could look under the hoods of every car in this year's race, you would see some interesting ideas which later may be introduced in passenger car engines.

■ SOME important meetings of executives in leading motor car divisions have been held here in the past two weeks to determine what effect earlier reports of plans to introduce some 1940 models this summer may have had on spring sales.

Consensus was that these reports have had a definitely injurious effect, and as a result some of the pressure has been eased off on new model programs and the lid clamped down tighter on public and private discussions of new models.

With one or two exceptions, it now appears the bulk of 1940 models will appear about on schedule, or in sufficient time to make initial appearances at the New York showing Oct. 11. Dealers are being discouraged from making advance comment on new models; in fact, retail outlets of one leading low-price car are telling customers their 1940 models will not be available until next January.

First-quarter financial report of General Motors Corp. which revealed a net profit of over $53,000,000, or $1.18 per share on common stock, is the best showing the corporation has made for this period since 1929, and could be considered one potent reason for putting added pressure on sales of 1939 models and delaying new models.

Current war scare and agitation over national defense needs are accredited in some sources with being additional reasons for deferring activity on 1940 models. In the event of an emergency, it is likely most of the large motor plants would be conscripted for war *materiel* production, and should such an emergency arise in the next few months, it would be better not to have any conflict with new model programs.

Bodies for the small Nash car which has been in process of development for the past year will not be made by the Seaman body division of Nash, but instead will be fabricated and assembled by an outside source, probably Briggs. Inasmuch as production dies as yet have not been started, it probably will be six months at least before the car will be ready for introduction.

Releases on certain parts for Chevrolet May production schedules indicate present plans call for 70,000 assemblies. This is somewhat below the 90,000 assembled in March and the indicated 86,000 assembled in April, but could be moved up this month if retail demand should justify an increase.

■ NEWSMEN, suppliers, 200 distributors and others were on hand Friday at Indianapolis motor speedway for the formal unveiling of the new Crosley car, the debut being maestroed by promoter Steve Hanagan. A few cars, with bodies and frames largely handmade by Murray Corp. in Detroit were displayed and showed some changes from the original specifications outlined here a year ago. Wheelbase has been lengthened to 80 inches, and both front and read tread are 40 inches. Bodies have both front and rear seats, each accommodating two passengers. Two hundred distributors represented the 25,000 Crosley dealers who will retail the car.

Latest figures supplied by Buick show domestic retail sales for the second ten days of April totaled 9614 units, or 61 per cent ahead of the same period a year ago and also a month ago. Volume was the highest in ten years and was accompanied by used car sales of better than 14,000 units.

Hudson has just announced a series of eight convertible models which are being featured in spring colors and in two body types, three-passenger coupe and six-passenger brougham. Tops fold down into recesses in the body, upholstery is all in colored leather. Eleven body colors, nine of the opalescent type, are offered. A rather important shakeup has been made in Hudson personnel, including the resignation of sales manager W. R. Tracy as announced in STEEL last week.

Another personnel change in the motor industry recently effected is the association of Chester C. Codding, for 15 years connected with various units of Chrysler Corp., with Willys-Overland Motors Inc. as assistant to the general manager. Mr. Codding at one time was associated with the former Maxwell and Chalmers automobiles, then with the first Chrysler model, and latterly as assistant to Byron Foy, president of De Soto.

Commenting on plastics for use in automobiles, S. G. Saunders, staff officer of Chrysler, stated at a recent chemical society meeting: "The ideal plastic material would have the strength and rigidity of alloy steel, the ease of forming and shaping of potter's clay, the toughness of sugar maple, the colors of the rainbow, and the finish of 'superfinished' tool steel." Engineers, he stated, still doubt that anything developed so far in the organic plastics field can take the place of steel in any of the fundamental or structural parts of the automobile.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1937	1938	1939
Jan.	399,186	227,130	353,946
Feb.	383,900	202,589	312,141
March	519,022	238,598	389,489
3 mos.	1,302,108	668,346	1,055,576
April	553,231	238,133	*352,000
May	540,377	210,183	.....
June	521,153	189,399	.....
July	456,909	150,444	.....
Aug.	405,072	96,936	.....
Sept.	175,630	89,623	.....
Oct.	337,979	215,296	.....
Nov.	376,629	390,350	.....
Dec.	347,349	407,016	.....
Year	5,016,437	2,655,777	.....

*Estimated.

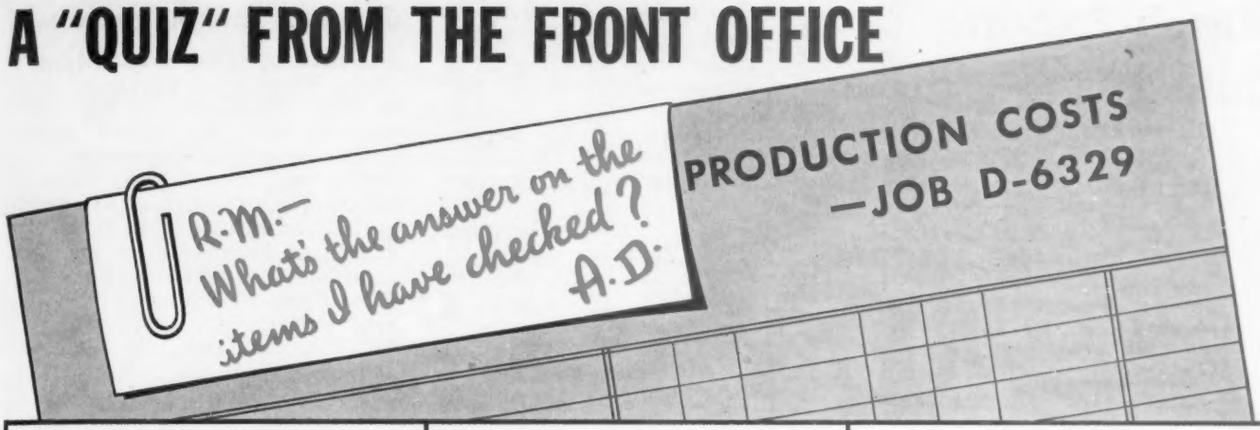
Estimated by *Ward's Reports*

Week ended:	1939	1938†
April 1	85,980	57,500
April 8	87,019	60,975
April 15	88,050	62,021
April 22	90,280	60,563
April 29	86,640	50,755

†Comparable week.

	Week Ended	
	April 29	April 22
General Motors	35,005	34,405
Chrysler	19,325	23,625
Ford	21,460	21,480
All others	10,850	10,770

A "QUIZ" FROM THE FRONT OFFICE



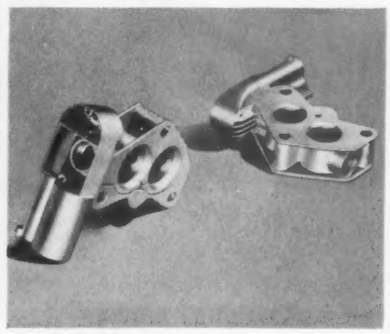
DIE COST ✓

Q Does the cost of die casting dies compare favorably with the tooling costs of other production processes?

A Contrary to general opinion, tooling for die casting—especially in zinc alloys—is often lower in cost than for comparable manufacturing methods. And in most cases one die will suffice for the rapid production of sizable quantities.

MACHINING ✓

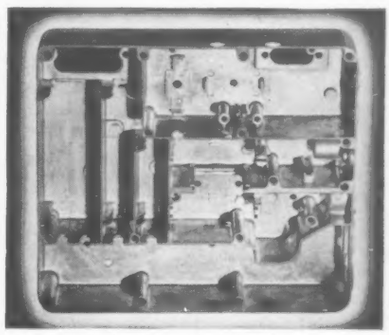
Q Does die casting eliminate the necessity for costly machining operations?



A No metal production method can entirely eliminate the necessity for machining. But the number of operations was reduced 77% when the above part was switched to a die casting. 40 major machining operations were formerly required. Now there are only 9—and these are simple and economical. This is just one of many cases in which impressive machining economies have been reported.

ASSEMBLING ✓

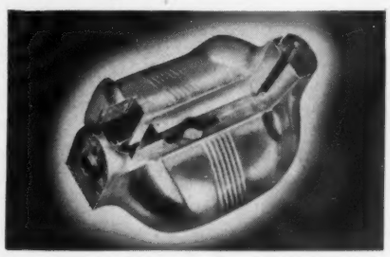
Q Can assembly costs be pared with die castings?



A This ZINC Alloy Die Casting—an automobile radio chassis—was produced in one shot. By no other method could such complexity of design be economically achieved—in one piece. The savings in assembly are obvious.

CASTING ✓

Q Can production dollars be saved through the castability of the ZINC Die Casting Alloys?



A This washing machine wringer frame presented difficult casting requirements. Its size (18½" x 13" x 6⅝"), the necessity for accurately positioned fastening elements, sharp detail, smooth surfaces, and thin sections all added up to impressive production economies through the unusual castability of the ZINC Die Casting Alloys.

Although ZINC Alloy Die Casting ✓ has received wide recognition as a low cost production method, the excellent physical characteristics of the die castings themselves should not be overlooked. If you are not aware of these advantages we suggest that you consult a commercial die caster—or write to The New Jersey Zinc Company, 160 Front Street, New York.

ZINC ALLOY DIE CASTINGS

The Research was done, the Alloys were developed, and most Die Castings are specified with

HORSE HEAD SPECIAL (99.99+% Uniform Quality) ZINC

March Exports Gain 20 Per Cent

■ MARCH iron and steel exports, excluding scrap, totaled 162,098 gross tons valued at $12,569,693, an increase of 20.3 per cent in volume and 28.6 per cent in value compared with 134,777 tons valued at $9,772,707 tons in February. In March, 1938, exports were 188,185 tons valued at $13,983,304.

Exports in the first quarter totaled 431,663 tons valued at $32,556,947, comparable figures for the period last year: 621,792 tons valued at $41,585,202. The reductions are 30.6 per cent in quantity and 21.7 per cent in value.

Nonalloy plates represented the largest amount in March, 27,942 tons; including 12,950 tons to Kwantung, 3875 tons to Sweden, 2061 tons to the Netherlands and 1946 tons to Italy. Nonalloy black steel sheets were second, 27,805 tons; 7963 tons to Russia, 2875 tons to Canada, 2839 tons to the United Kingdom, 2268 tons to Chile and 2199 tons to Mexico.

Tin plate accounted for 16,735 tons; 2069 tons to the Netherlands, 1893 tons to Brazil, 1765 to French Indo-China, 1520 to British Malaya and 1461 to the Philippines.

Canada Heaviest Buyer

Canada led all markets with 15,200 tons, which included 2875 tons of nonalloy black steel sheets, 1971 tons of structurals and 1413 tons of nonalloy hot-rolled strip. Kwantung ranked second, 13,835 tons; the Philippines third, 12,787 tons; and Japan fourth, 9745 tons.

March scrap exports totaled 310,223 tons valued at $4,640,598, largest this year. February totals were 222,704 tons valued at $3,345,344; March, 1938, 334,742 tons valued at $5,530,042.

Scrap exports for three months, 758,361 tons valued at $11,337,293, were 19.8 per cent in volume and 29.2 per cent in value under first quarter, 1938. Japan took 200,470 tons, Italy 69,540 tons and Sweden 9521 tons.

UNITED STATES EXPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

Article	March 1939	Feb. 1939	Jan. thru March 1939
Pig iron	1,059	4,524	11,908
Ferromanganese and Spiegeleisen	18	9	27
Other ferroalloys	68	22	193
Ingots, blooms, etc.:			
Not containing alloy	5,709	10,140	29,215
Alloy, incl. stainless	408	3,335	4,724
Steel bars, cold fin.	498	542	2,330
Bars, iron	58	54	173
Bars, concrete	2,181	1,378	6,030
Other steel bars:			
Not containing alloy	12,702	7,039	26,662
Stainless steel	117	4	132
Alloy, not stainless	993	1,144	3,489
Wire rods	2,654	360	3,367
Boiler plate	171	564	1,853
Other plates, not fab.:			
Not containing alloy	27,942	20,324	58,017
Stainless steel	8	6	17
Alloy, not stainless	70	70	178
Skelp iron or steel	714	637	2,093
Sheets, galv. iron	385	335	1,149
Sheets, galv. steel	7,202	5,433	19,961
Sheets, "black" steel:			
Not containing alloy	27,805	19,886	71,959
Stainless steel	76	41	169
Alloy, not stainless	290	31	668
Sheets, black iron	616	577	1,769
Strip steel, cold-rolled:			
Not containing alloy	1,436	2,212	5,625
Stainless steel	21	45	122
Alloy, not stainless	23	31	65
Strip steel, hot-rolled:			
Not containing alloy	2,608	5,765	13,453
Stainless steel	.....	.....	100
Alloy, not stainless	2	3	6
Tin plate, taggers' tin	16,735	10,968	40,373
Terneplate	232	221	611
Tanks, except lined	2,881	374	4,697
Shapes, not fabricated	6,522	5,603	17,529
Shapes, fabricated	3,422	2,180	7,020
Plates, fabricated	315	153	615
Metal lath	102	85	266
Frames and sashes	91	105	237
Sheet piling	140	546	853
Rails, 60 lbs.	3,465	3,681	10,058
Rails, under 60 lbs.	123	97	305
Rails, relaying	686	972	1,840
Rail fastenings	732	832	2,206
Switches, frogs, crsgs.	302	58	543
Railroad spikes	212	676	995
Railr'd bolts, nuts, etc.	213	123	409
Boiler tubes, seamless	651	439	1,475
Boiler tubes, welded	5	3	16
Pipe:			
Smls casing, oil-line	5,129	4,854	13,212
Do., Welded	274	61	628
Seamless black	452	415	1,608
Pipe fittings:			
Mall. iron screwed	270	248	827
Cast-iron screwed	175	145	405
Pipe and fittings for:			
Cast-iron pressure	1,274	1,170	4,498
Cast-iron soil	546	663	1,844
Pipe, welded:			
Black steel	1,280	1,272	3,742
Black wrought iron	424	147	1,063
Galvanized steel	2,368	1,571	5,435
Galv. wrought-iron	160	382	745
*All other pipe, fittings	302	286	836
Wire:			
Plain iron or steel	3,154	1,345	6,521
Galvanized	1,773	2,477	6,368
Barbed	3,404	1,937	7,720
Woven-wire fencing	364	198	769
Woven-wire screen cloth:			
Insect	39	29	102
Other	128	114	351
Wire rope and cable	288	379	909
Wire strand	127	102	269
Electric welding rods	147	62	297
Card clothing	5	3	14
Other wire	577	450	1,597
Wire nails	1,497	1,176	4,201
Horseshoe nails	87	53	206
Tacks	21	22	56
Other nails, staples	351	252	912
Bolts, mach. screws	774	549	1,909
Castings:			
Gray iron (incl. semi-steel)	309	219	787
Malleable iron	118	132	370
Steel, not alloy	57	190	283
Alloy, incl. stainless	116	200	394
Car wheels, tires, axles:			
†Car wheels and tires	1,094	655	2,540
†Car axles, no wheels	743	62	1,375
†Car axles with wheels	587	610	1,221
Horseshoes and calks	6	30	37
Forgings, n.e.s.:			
Not containing alloy	666	618	1,681
Alloy, incl. stainless	349	72	429
Total	162,098	134,777	431,663
Scrap, iron and steel	310,223	222,704	758,361
Scrap, tin plate	866	805	2,528
Tin plate circles, strips, cobbles, etc.	437	546	1,765
Waste-waste tin plate	736	858	2,405
Total scrap	312,262	224,913	765,059
GRAND TOTAL	474,360	359,690	1,196,722
Iron ore (gross tons)	65,890	1,079	67,213

*New class. Includes flanged malleable cast-iron fittings, expansion joints, and riveted pipe and fittings.
†New class.

Japan Doubles Imports Metalworking Machinery

■ Japan's metalworking machinery imports from the United States, United Kingdom, Germany and Switzerland, which supply about 99 per cent, were valued at $35,540,986 in 1938, compared with $17,450,440 in 1937, an increase of 104 per cent, according to the machinery division, department of commerce, in a current report. Compared with $5,359,707 in 1935 the 1938 total was about six and one half times as large.

United States was the principal source in 1938, supplying equipment valued at $23,811,408. With shipments at $2,285,000 per month so far this year, 1939 may show a higher total.

In 1934 Germany supplied 44.3 per cent of Japanese imports in this class, the United States 43.7 per cent. In 1938 Germany's share was 26.6 per cent; United States 67 per cent. The machinery division reports that European conditions may allow Germany to export more heavily and points out that in 1938 that country's machinery exports to Japan increased 149 per cent, the largest gain of the four leaders. Further comparisons:

	1937 Value	1937 %	1938 Value	1938 %
U. S.	$12,151,886	69.6	$23,811,408	67.0
Germany	3,788,825	21.7	9,437,737	26.6
Unit. King.	776,178	4.5	1,516,555	4.3
Switzerland	733,551	4.2	775,286	2.1
Total	$17,450,440	....	$35,540,986	....

Machinery Exports Up 17 Per Cent in March

■ March industrial machinery exports were valued at $29,594,195, or 17 per cent more than in March, 1938, according to the machinery division, department of commerce.

Power-driven metalworking machinery reached a record at $12,057,012, a gain of 45 per cent over $8,297,396 in March, 1938. Continued large shipments to Russia, Japan and the United Kingdom and sharply increased exports to France accounted for the increase, over 80 per cent going to these four countries.

Power generating equipment, except electric and automotive, represented $2,099,629 in value, 40 per cent gain over March, 1938. Due to large increase in petroleum well and refining equipment exports, the mining, well and pumping equipment group made a slight gain, from $6,147,255 in March last year to $6,259,655 in the month this year.

Construction and conveying machinery exports declined 32 per cent from March, last year, with value of $1,827,541, compared with $2,669,622.

New Steel Uses In Safety Liner

■ UNIQUE and extensive uses of steel—for fireproofing and decoration—are incorporated in the PANAMA, first liner placed in service under the new safety specifications of the bureau of marine inspection and navigation.

The ship, one of three 10,000-gross ton vessels for the Panama Railway Steamship Co.'s service between New York and the Canal Zone, required 4500 tons of steel. It was designed by George G. Sharp, New York naval architect, with Raymond Loewy, industrial designer, collaborating in decorations and finishings, and was built by Bethlehem Steel Corp. at the Fore River yards, Quincy, Mass., where two sister ships, the ANCON and CRISTOBAL, are nearing completion.

Liner has capacity for 202 passengers, in addition to crew, and each of its 70 cabins is equipped with private bath. Overall length is 493½ feet; molded beam, 64 feet; depth from promenade deck, 46 feet, 9 inches. Net tonnage is 5925; total deadweight tonnage, 6800.

All partitions are asbestos-core steel panels. Ten transverse watertight bulkheads divide the vessel into 11 compartments with local subdivisions in machinery spaces. Any three of these compartments, it is said, may be pierced simultaneously without affecting the ship's ability to stay afloat.

Furniture is steel, aluminum alloys and other noninflammable materials, with sponge rubber and fireproofed fabrics in upholstery. Venetian blinds in cabins are steel. Controls for a modern fire detection system and extinguishers are centralized in a special station.

Simple, unified and modern effects are achieved in decorative treatment. Windows are grouped into panels; steel structural beams are accented or subdued, according to effect desired.

Ship is decorated throughout in pastel shades, with stainless steel, aluminum alloys and plastics effectively used.

■ **Stainless steel, aluminum, glass and synthetics contribute to a simple, modern style in the fire-proof liner, the PANAMA, first to be built under the new safety specifications adopted by the bureau of marine inspection and navigation following the MORRO CASTLE and MOHAWK disasters**

MEETINGS

INSTITUTE PROGRAM LISTS FOUR TECHNICAL PAPERS

■ PROGRAM for the forty-eighth general meeting of the American Iron and Steel institute, Waldorf-Astoria hotel, New York, May 25, includes morning session, an informal luncheon, an afternoon technical session, and a banquet. As in recent years, attendance at all meetings will be restricted to members.

T. M. Girdler, chairman, Republic Steel Corp., Cleveland, and president of the institute, will preside at the morning session and will deliver the opening address. Other speakers at this session will be B. F. Fairless, president, United States Steel Corp., Pittsburgh; and Arthur Roeder, chairman, Colorado Fuel & Iron Corp., Denver.

Charles M. White, vice president, Republic Steel, Cleveland, will preside at the technical session. Papers and their authors: "Metallurgy and Technique of Welding," by Isaac Harter, executive vice president, Babcock & Wilcox Tube Co., New York; "Problems in the Manufacture and Use of Steel in the United States," by James E. Lose, vice president, Carnegie-Illinois Steel Corp., Pittsburgh; "Problems in the Manufacture and Use of Steel in Great Britain," by James Henderson, deputy chairman, Appleby-Frodingham Steel Co. Ltd., London; and "Training of a Metallurgist," by Bradley Stoughton, dean of engineering, Lehigh university, Bethlehem, Pa.

MIDDLE ATLANTIC CHAPTERS OF A.S.M. TO MEET MAY 19

New York, New Jersey, Penn State, York, Lehigh Valley, Philadelphia and Baltimore chapters of the American Society for Metals will conduct a Middle Atlantic group meeting at the Manufacturers and Bankers club, Philadelphia, May 19.

Dr. Edgar C. Bain, assistant to vice president, United States Steel Corp., Pittsburgh, will address a morning technical session. Philadelphia Electric Co. will entertain at lunch at the club, the speakers to be William F. James, president, Philadelphia chamber of commerce, and George E. Whitwell, vice president in charge of sales, Philadelphia Electric Co.

Afternoon will be spent in visiting the plant of the Alan Wood Steel Co., Conshohocken, Pa., and a tour of Valley Forge. W. H. Eisenman, national secretary, American Society for Metals, Cleveland, will be toastmaster at the dinner; the principal speaker, Dr. John R. Hart, rector, Valley Forge Memorial chapel.

A.S.T.M. ARRANGING PROGRAM FOR ITS ANNUAL MEETING

Among important technical features of the forty-second annual meeting of the American Society for Testing Materials at Chalfonte-Haddon Hall, Atlantic City, N. J., June 26-30, will be discussions on effect of subatmospheric temperatures on properties of metals, fatigue of metals, radiography and quantitative spectrochemical analysis.

Demand has been growing in many industries for materials having properties suitable for use at low temperatures, including oil refineries, aircraft, railroads, and various chemical processes involving refrigeration. A roundtable on this subject will provide means for gathering available knowledge.

The fifth exhibit of testing apparatus and related equipment will be conducted during the five days of the meeting, a number of manufacturers having engaged space.

Tool Builders Base Confidence in Future on Peace-Time Activities

■ DESPITE the current mild decline in the general business index, general tone of the thirty-seventh spring convention of the National Machine Tool Builders' association, at the Edgewater Beach hotel, Chicago, April 24-25, was far more hopeful than that of the corresponding meetings in recent years. The convention was attended by top executives of a large proportion of the 135 tool building companies constituting the association.

Current conditions and the outlook for the reasonably immediate future—as described and analyzed by those who addressed the meeting this year—are such as to inspire definite confidence among machine tool builders, not only in the overall business outlook for 1939 but also as to the strength of the economic and engineering foundation upon which the industry now rests.

Deplore War Hysteria

It should be stated that this spirit of confidence has in no way been inspired by the war hysteria sweeping over Europe. This state of affairs is deeply deplored by American machine tool builders. While clearly understanding the importance of their industry in connection with preparations for adequate national defense of America, they are pinning their faith in the future on the wide opportunities presented by peacetime industrial activities in the United States and Canada, and not on any munitions activities generated by any foreign wars—either declared or undeclared.

Wendell E. Whipp, president, Monarch Machine Tool Co., Sidney, O., and president of the Tool Builders' association, crystallized the spirit of the convention when he captioned his opening address "Change Brings Opportunity." Drastic and rapid revisions in design of such things as railway equipment, automobiles, and aircraft, said Mr. Whipp, have meant that to make possible the production of these things the building of machine tools has had to become "America's fastest moving industry."

The charge sometimes made, that there is not enough research in the machine tool industry, can, according to Mr. Whipp, be refuted by pointing out that research as practiced by machine tool builders goes on in the shop and in customers' plants, rather than in the detached laboratories which are common today in many other industries.

While he deplores the taxes and undue governmental regulation which continue to discourage the re-equipping and expansion of established manufacturing enterprises and the establishment of new companies which ordinarily would require large numbers of production machines, Mr. Whipp sees definite signs of waning of fallacious public and legislative reasoning. As one of the encouraging instances along this line, he cited the case of a well-known hosiery mill, the management of which recently has been urged by the workers therein to install new and better production equipment.

An interesting exposition of the real trade conditions in South America, as far as American industry is concerned, was made by John Abbink, president and general manager, Business Publishers' International Corp. Mr. Abbink, who has just returned from an extensive trade investigation trip to South America, said: "Hysteria about foreign trade has distorted the real conditions south of the Rio Grande. Despite the quantities of crocodile tears being shed over the situation by some of the popular columnists, we still hold a dominant position in South American trade."

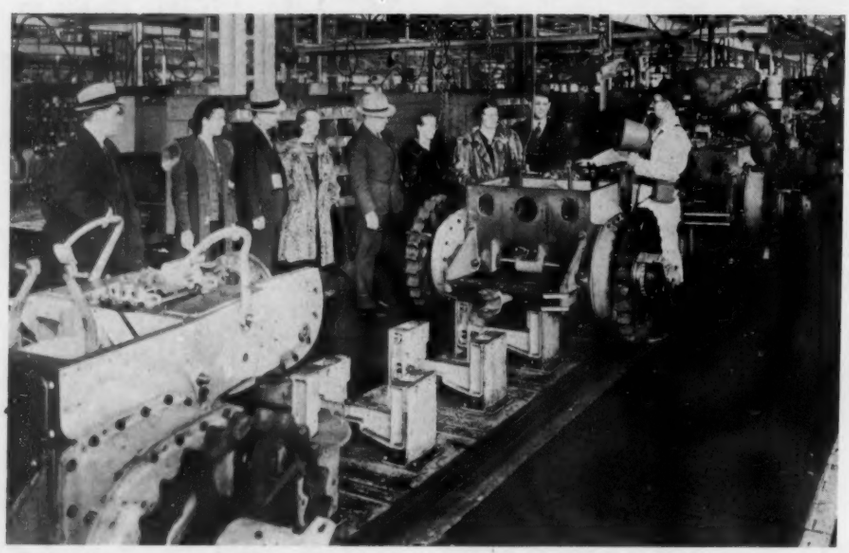
Outlook in South America

As far as the machine tool industry is concerned, Mr. Abbink pointed out that while opportunities for the sale of machines for production purposes in South America are very slim and will be for many years to come, there is an excellent opportunity there for the sale of high grade machinery for servicing and repair purposes. Due to the tremendous distances from which mechanical equipment and repair parts thereof must be shipped to reach points in South America, railway, aircraft, and automotive parts, etc., ordinarily purchased, are made in service and repair shops. As a result, some of the largest and finest shops of this kind anywhere in the world are located in South America.

Another speaker who painted an interesting and rather rosy picture of trade opportunities for American machine tool builders beyond the borders of the United States, was Russell T. Kelley, president, Russell T. Kelley Ltd., Hamilton, Ont., and director of the Canadian chamber of commerce. Mr. Kelley, addressing a luncheon meeting, used as his text Elbert Hubbard's maxim: "You get business from your friends—not from your enemies. Therefore have as many friends and as few enemies as possible."

Inasmuch as the highly desirable condition of friendship already does exist to a high degree between Canada and the United States; in view of the wealth and relative prosperity of Canada; in view of the rapid industrial development in that country and the low cost of selling

Amplifier Carries Guides' Story to Visitors



■ Portable amplifiers carried by guides showing visitors through Caterpillar Tractor Co.'s plant at Peoria, Ill., make explanations audible to all listeners. The company considers this an important step in its public relations program

machinery there; Mr. Kelley's advice to American machine tool builders is: "Go after machine tool business in Canada and go after it now!" He urged that executives of machine tool companies make it a point to see Canadian machine tool dealers frequently, rather than trying to carry on all the business by mail as has been common practice in the past.

J. Y. Scott, vice president, Van Norman Machine Tool Co., Springfield, Mass., spoke on the subject of "Profit Engineering." Inasmuch as profit policy is bound to be at the root of any industrial enterprise, a synthetic character known as the "profit engineer" has just been created in connection with a national industrial advertising campaign. This character, said Mr. Scott, may be working for a machine tool builder or he may be working for a customer or prospect. He may be a treasurer; he may be a sales manager; he may be a factory man; he may be an investment broker or banker.

If properly informed, he will be a powerful factor toward promoting the purchase of new industrial machinery—if not, he is very likely to "stymie" plans for re-equipment, especially in directors' meetings. Therefore, Mr. Scott urged that machine tool builders should in one way or another "profit motivate" all their selling efforts, to the end that every prospect shall become a properly informed "profit engineer."

In his paper on "Industrial Education," Everard Stubbs, factory manager, Fellows Gear Shaper Co., Springfield, Vt., outlined in considerable detail his conception of what he characterized as "industrial training for the world of tomorrow." He pointed out that because of the increasing demands being made on the machine tool industry for machines which in one way or another are "special" to suit the customers' individual requirements, a great deal of work in machine tool plants must now be done without jigs and fixtures. This calls for an unusually large number of mechanics in the shop with the skill and versatility which in the past has been common only in the toolroom.

Most boys today, said Mr. Stubbs, are definitely "machinery conscious" because they literally have been brought up in intimate association with radios, automobiles and other things mechanical. With such desirable raw material to work with, Mr. Stubbs believes that skilled, versatile mechanics can be developed rapidly by the simple expedient of shifting the more able young men about in the shop from job to job —a procedure which also serves to stimulate the ambition of men who may be in danger of going to seed on any one job. "Thus," said Mr. Stubbs, "foremen and superintendents of shops are now the 'faculty' of what may well be called America's greatest industrial school."

Mrs. Frida F. Selbert, secretary of the association, Cleveland, and widely recognized for her work as an economist in the capital goods industry, presented a significant paper covering "The Outlook for the Machine Tool Industry." At the beginning Mrs. Selbert advocated April or May as a far better time to get the "long view" of business, than the year end so commonly chosen as the time for such observations.

1939 Will Better 1938

While there has been too much dependence during recent months on foreign business, this condition has been due fully as much to failure of private capital to be invested as it should be in American industry, as it has been to abnormal conditions abroad. Incidentally, national defense requirements are nowhere near as important to the machine tool industry as the general public has been led to believe.

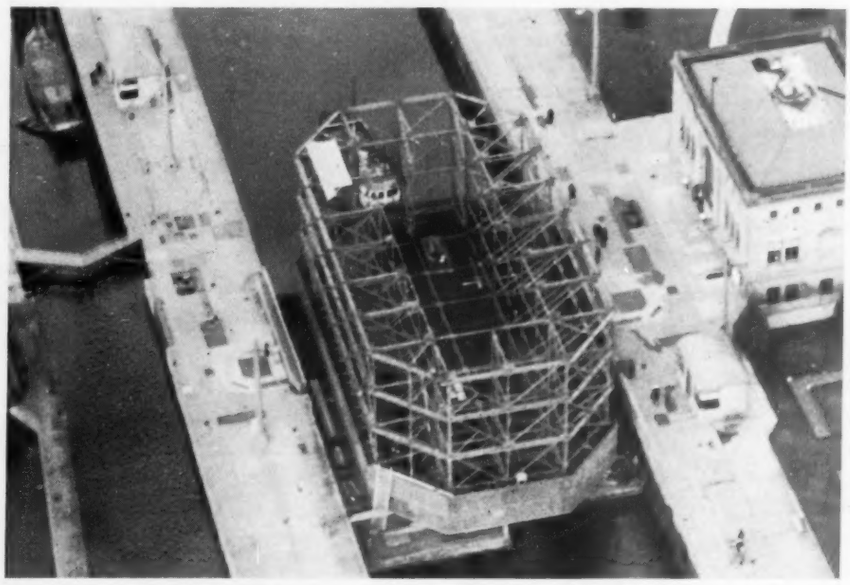
This year's average business for machine tool builders should, according to Mrs. Selbert's conclusions, be well above that of 1938. How far above, she believes, depends to no small degree upon effective promotion of the profit idea in machine tool selling. Mrs. Selbert's talk, which was illustrated by graphical charts, was discussed by Ralph E. Flanders, president, Jones & Lamson Machine Co., Springfield, Vt. Mr. Flanders said that to support the present wage scales, workmen in America must be provided with more and better tools, "a conviction which should make us all better salesmen."

The final paper at the convention was something of an innovation for one of these association meetings—being primarily of an engineering and production character. This paper, entitled "Airplane Engines of the Future," was by J. Carlton Ward Jr., general manager, Pratt & Whitney division, United Aircraft Corp., Hartford, Conn. It proved to be of keen interest to the machine tool builders—revealing as it did the important role which their machines are playing in aircraft engine production and the great possibilities for them which lie ahead in this relatively new and precedent-breaking industry.

Implying that an industry which does not hesitate to smash up a $50,000 hand-built model engine in tests,

(*Please turn to Page* 46)

Giant Steel Caissons Barged, Floated 75 Miles



■ Two steel caissons, 66 x 120 feet, 50 feet high, have been placed 150 feet deep in Puget Sound at Tacoma, Wash., as pier foundations for the Narrows bridge, world's third longest suspension span. Steel was erected on barges at Seattle by Pacific Car & Foundry Co., towed 25 miles through Lake Washington canal to Lake Washington Shipyards, where watertight timber floor and sides were placed. Towed back 25 miles to Todd Shipyards Corp.'s dock, they were launched, floated 25 miles to the bridge site, and sunk. Illustration shows barge, 79 feet wide, with 825-ton steel caisson, traversing an 80-foot canal lock.

Editorial

Businessmen Falter in Public Relations

■ STEEL recently addressed this question to a number of heads of typical size companies in the metalworking field: "What are you doing to influence the man-in-the-street in your community to a greater realization that more jobs and greater security can be created for the average individual through a national policy of encouraging the investment of more capital in industry?"

None of the companies that replied is doing any such public educational work directly. A few of them are familiar with, and endorse educational work such as that of the National Association of Manufacturers. One stated he is co-operating actively in such effort, but is not doing anything of a direct nature.

Industrial leaders continue singularly lax in this matter of public relations. That they are keenly concerned about the problems that confront the country, and have definite ideas as to how the march toward greater security and a better plane of living conditions can be resumed, is well attested by the large amount of discussion they devote to this subject. The trouble is that they usually do their talking with others of like mind, or in meetings attended by other executives who think in much the same terms as they do.

Should Spread Message of Business Needs Among People of Community

If men who attend meetings of this kind would go to the trouble, on returning to their home towns, of telling their fellow citizens, through their local newspapers, or before local gatherings, what went on at those meetings, the average citizen would become more aware that what industry wants is what the country needs—namely, more business, more employment and greater public purchasing power.

There is little doubt that we as a nation will eventually find our way out of our present troubles. This will come when the majority of voters understand clearly just what must be done to make life enjoyable and secure. Much progress already has been made in this direction and the popular feeling toward business is one of greater friendliness. Political officeholders no longer are strafing business. Congress, though fumbling in the matter of initiating correctives, refuses to legislate further business "reforms". Recent polls, for example, reveal that the average voter regards the Wagner act as unfair, so that its eventual revision is assured.

Industrial Leaders Can Hasten Progress by Localizing Problems

Such progress could be hastened materially if industrial leaders made it their business to see that the man-in-the-street knows what will make business "go". They can do a lot along this line by cultivating the newspapermen in their communities and encouraging them to publish details as to how national policies, or other factors that can be influenced by the public, affect the fortunes of the particular community through their effects on business. If the people knew just what causes are responsible for reduced employment or number of working hours, they would know more specifically what to favor and what to oppose when casting their votes. And legislators would have a better understanding as to what was wanted by their constituents.

It is not enough for an industrial executive to run his business efficiently these days. It is also his responsibility to inform the people in his community as to what sort of help he needs in order to provide more employment and contribute in maximum degree to the general welfare of his neighbors.

The BUSINESS TREND

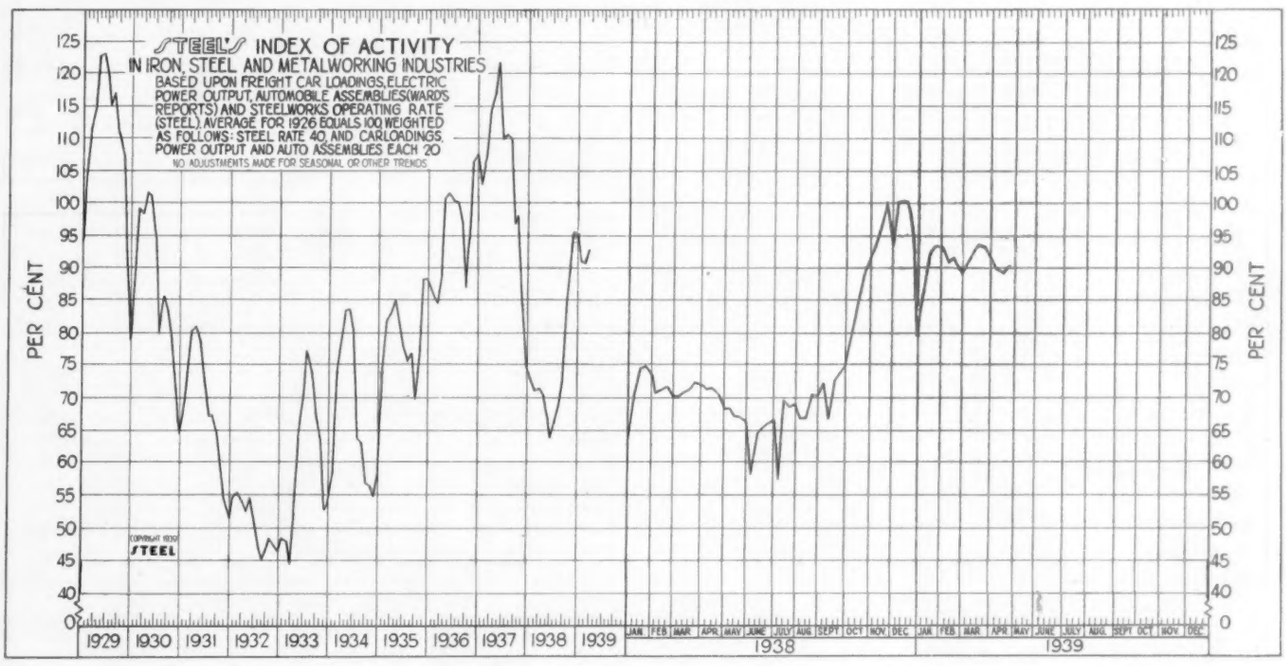
Activity Index Reverses Recent Downward Tendency

■ REFLECTING gains in automobile production, electric power consumption and revenue freight carloadings in the week ended April 22, STEEL's index of activity reversed the downward tendency of the preceding four weeks. Index now stands at 90.4, a gain of 0.7 point over the previous week. Current activity level recorded by the index remains substantially above the 70.8 registered in the comparable week last year. However, comparison with the peak last year of 100.7, recorded in the week ended Dec. 10, indicates industrial activity has declined 10.3 per cent in the past few months.

Uncertainties in the European situation and disappointing domestic factors, such as lower steel operations and a slowing down in commercial and industrial building, has intensified corporate management's caution in making forward commitments. Of particular concern is the scarcity of private capital financing and corporate investments in equipment, at a time when a tapering off in government pump-priming expenditures approaches.

Steelmaking operations eased 1 point to 50.5 per cent of capacity in the week ended April 22 to record the fifth consecutive weekly decline. Indications are for still lower level operations in the week ended April 29. Excluding the holiday week ended Dec. 31, the present national steel rate is the lowest since the week ended Oct. 8. However, a year ago the steel operations were below the current level at 32 per cent.

Aided by increased production at Plymouth and Dodge plants, automobile output advanced for the third conse-


STEEL'S INDEX OF ACTIVITY
IN IRON, STEEL AND METALWORKING INDUSTRIES
BASED UPON FREIGHT CAR LOADINGS, ELECTRIC POWER OUTPUT, AUTOMOBILE ASSEMBLIES (WARD'S REPORTS) AND STEELWORKS OPERATING RATE (STEEL). AVERAGE FOR 1926 EQUALS 100 WEIGHTED AS FOLLOWS: STEEL RATE 40, AND CARLOADINGS, POWER OUTPUT AND AUTO ASSEMBLIES EACH 20
NO ADJUSTMENTS MADE FOR SEASONAL OR OTHER TRENDS
PER CENT
125 120 115 110 105 100 95 90 85 80 75 70 65 60 55 50 45 40 0
1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
1938
1939
COPYRIGHT 1939 STEEL

STEEL'S index of activity gained 0.7 point to 90.4 per cent in the week ended April 22:

Week ending	1939	1938
Feb. 4	90.7	70.9
Feb. 11	92.1	71.2
Feb. 18	91.1	71.9
Feb. 25	89.3	70.3
Mar. 4	91.5	70.1
Mar. 11	92.7	70.8
Mar. 18	93.3	71.3
Mar. 25	93.2	72.4
April 1	92.2	72.0
April 8	90.0	71.3
April 15	89.7	71.4
April 22	90.4	70.8

Mo. Data	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Jan.	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6	104.1
Feb.	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2	111.2
March	92.6	71.2	114.4	88.7	83.1	78.9	44.5	54.2	80.4	98.6	114.0
April	....	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7	122.5
May	....	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2	122.9
June	....	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8	120.3
July	....	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9	115.2
Aug.	....	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4	116.9
Sept.	....	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7	110.8
Oct.	....	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8	107.1
Nov.	....	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0	92.2
Dec.	....	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3	78.3

cutive week to 90,280 units in the week ended April 22, compared with 88,050 in the preceding week and 60,563 units in the same week last year. However, the increase in automobile output the past few weeks has been below seasonal expectations, reflecting the less than seasonal pick-up in retail sales and resultant excessive dealers' stocks.

Revenue freight carloadings recorded a better than seasonal gain to 558,706 cars in the week ended April 22 and compare favorably with the 523,767 cars loaded in the same week last year. Electric power consumption of 2,199,002,000 kilowatt-hours during the week ended April 22 more than regained the loss in the preceding week and remains well above the 1,951,456,000 kilowatt-hours consumed in the same week a year ago.

FAILURES INCREASE IN MARCH

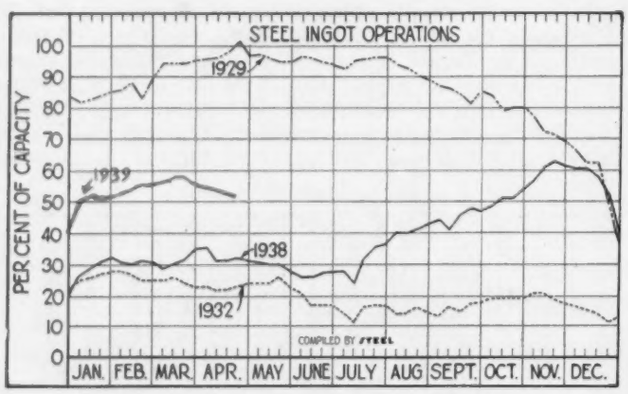
Commercial failures increased in March to 1123, with liabilities of $17,915,000. Failures during March compare with 963 disasters in February, with liabilities of $12,788,000, and were only 3.8 per cent under the 1167 failures recorded in March, 1938, with liabilities of $40,325,000. As compared with February, there were substantial increases in all classifications of business enterprise, but the reduction from March, 1938, was chiefly in the manufacturing division. Divided according to geographical location, the bulk of the increase in failures in March over February appeared to be in Chicago, Philadelphia, Kansas City and San Francisco Federal Reserve districts.

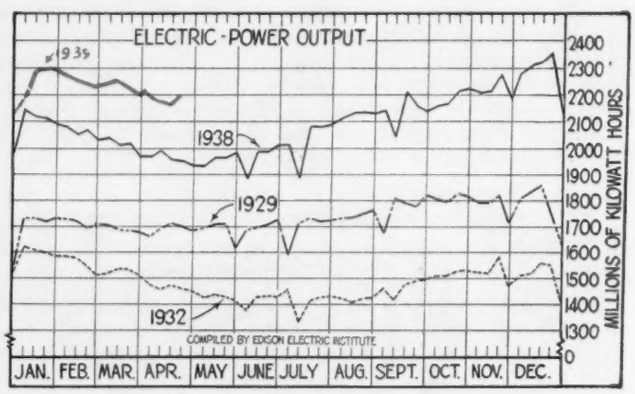
PRODUCTION UNCHANGED DURING MARCH

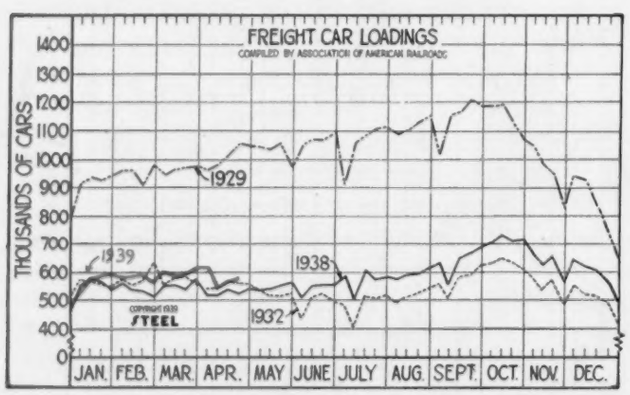
Volume of industrial production showed little change in March, according to the Federal Reserve board's seasonally adjusted index which remained unchanged from the February level of 98. A year ago the board's index stood at 79.9. The index for the first quarter averaged 99, compared with 101 in the final period last year. Manufacturing production in April has been maintained at about the same rate as in March, but mineral production declined reflecting the sharp reduction in output of bituminous coal.

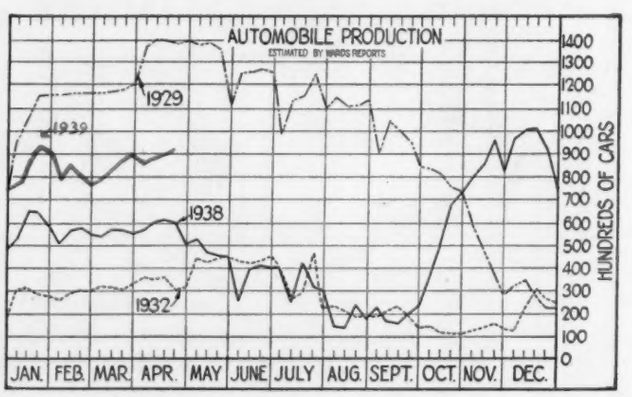
FOUNDRY EQUIPMENT ORDERS GAIN

The Foundry Equipment Manufacturers association reports foundry equipment orders for March set a new peak this year and were the best since October, 1937. Net orders for March were indexed at 146.6, against 135.3 in February and 114.6 in March of last year. Shipments also rose, lifting the index last month to 128.1, from the February level of 112.2. A year ago shipments were indexed at 99.4. Unfilled orders climbed to an index figure of 193.6 during March from 175.1 in February.

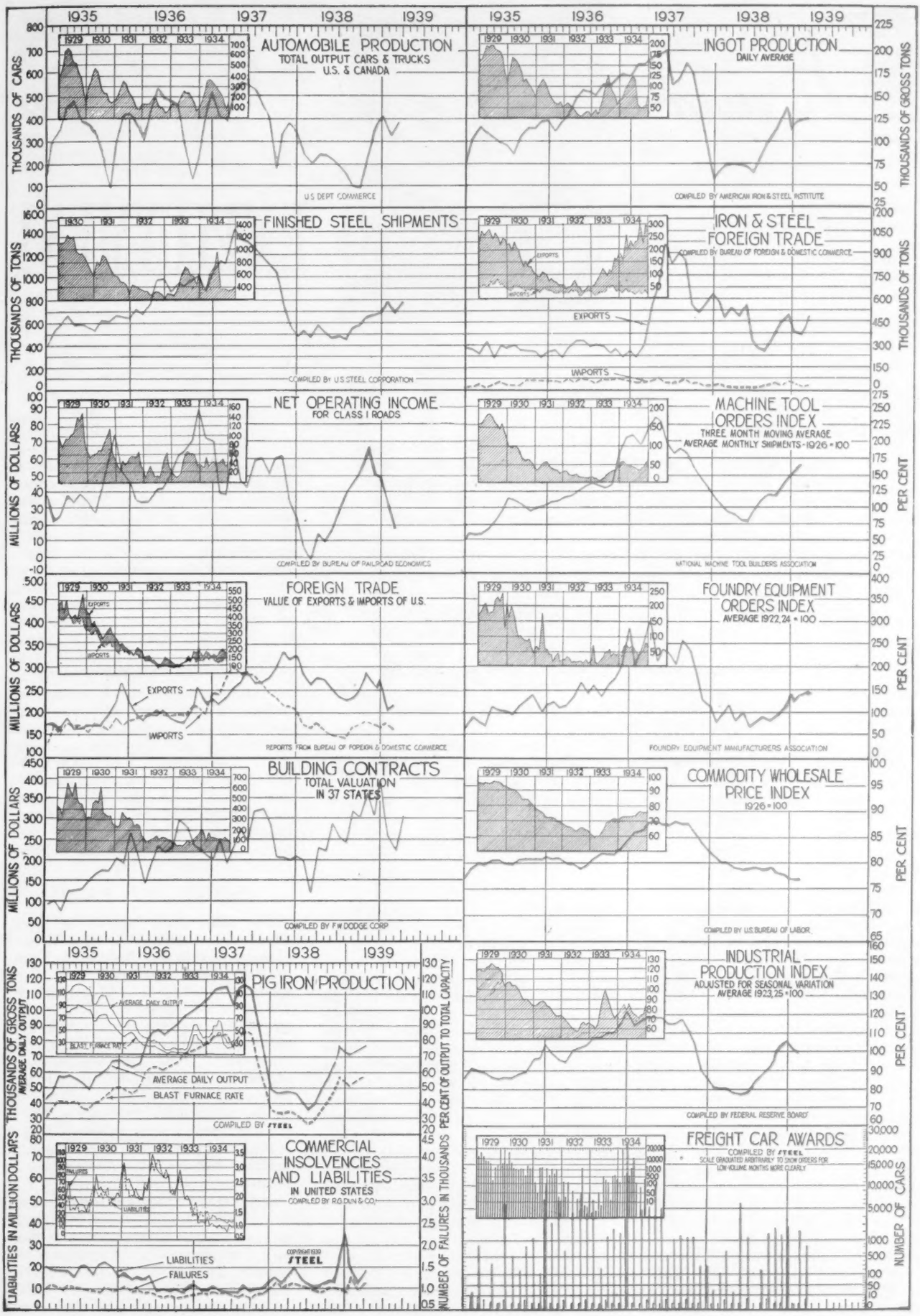




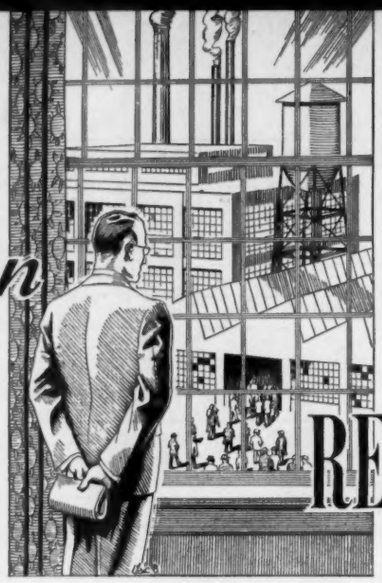




Week ending	Steelworks Operating Rate Per Cent 1939	1938	1932	1929	Electric Power Output Million KWH 1939	1938	1932	Freight Car Loadings Thousands of Cars 1929	1939	1938	1932	1929	Weekly Auto Output 1939	1938	1932	1929
Jan. 7	51.5	26.0	25.0	84.0	2,169	2,139	1,619	1,542	531	552	573	799	76,685	54,084	30,755	75,000
Jan. 14	52.0	29.0	26.0	82.0	2,269	2,115	1,602	1,734	587	580	572	914	86,925	65,735	31,416	95,000
Jan. 21	51.5	30.5	27.0	83.0	2,289	2,108	1,598	1,737	590	570	562	932	90,205	65,418	29,365	105,000
Jan. 28	51.5	33.0	28.5	84.0	2,292	2,098	1,588	1,717	594	553	560	926	89,200	59,365	28,950	115,000
Feb. 4	53.0	31.0	28.5	85.0	2,287	2,082	1,588	1,728	577	564	575	947	79,410	51,443	27,110	116,000
Feb. 11	54.0	30.0	27.0	86.0	2,268	2,052	1,578	1,726	580	543	562	956	84,500	57,810	29,320	116,000
Feb. 18	55.0	31.0	25.0	88.0	2,249	2,059	1,545	1,718	580	536	572	958	79,860	59,100	30,410	116,500
Feb. 25	55.0	30.5	25.0	83.0	2,226	2,031	1,512	1,699	561	512	636	907	75,660	56,977	30,150	116,500
Mar. 4	56.0	29.5	25.0	89.5	2,244	2,036	1,519	1,707	599	553	560	977	78,705	54,440	31,390	116,500
Mar. 11	56.5	30.0	25.5	94.5	2,238	2,015	1,538	1,703	592	557	575	946	84,095	57,438	31,110	116,500
Mar. 18	56.5	32.0	24.5	94.5	2,225	2,018	1,537	1,687	594	540	585	958	86,725	57,558	30,590	117,000
Mar. 25	55.5	35.0	23.0	94.5	2,199	1,975	1,514	1,683	605	573	561	961	89,400	56,800	32,892	117,500
Apr. 1	54.5	36.0	23.0	95.0	1,210	1,979	1,480	1,680	604	523	545	967	85,980	57,500	25,756	120,000
Apr. 8	53.5	32.0	22.0	95.5	2,173	1,990	1,465	1,663	535	522	545	956	87,019	60,975	35,390	138,417
Apr. 15	51.5	32.0	22.0	96.0	2,171	1,958	1,480	1,697	548	538	567	972	88,050	62,021	35,778	140,822
Apr. 22	50.5	32.5	23.0	98.0	2,199	1,951	1,469	1,709	558	524	562	1,004	90,280	60,563	30,672	140,290


AUTOMOBILE PRODUCTION
TOTAL OUTPUT CARS & TRUCKS U.S. & CANADA
U.S. DEPT. COMMERCE
INGOT PRODUCTION
DAILY AVERAGE
COMPILED BY AMERICAN IRON & STEEL INSTITUTE
FINISHED STEEL SHIPMENTS
COMPILED BY U.S. STEEL CORPORATION
IRON & STEEL FOREIGN TRADE
COMPILED BY BUREAU OF FOREIGN & DOMESTIC COMMERCE
EXPORTS
IMPORTS
NET OPERATING INCOME
FOR CLASS I ROADS
COMPILED BY BUREAU OF RAILROAD ECONOMICS
MACHINE TOOL ORDERS INDEX
THREE MONTH MOVING AVERAGE
AVERAGE MONTHLY SHIPMENTS - 1926 = 100
NATIONAL MACHINE TOOL BUILDERS ASSOCIATION
FOREIGN TRADE
VALUE OF EXPORTS & IMPORTS OF U.S.
REPORTS FROM BUREAU OF FOREIGN & DOMESTIC COMMERCE
FOUNDRY EQUIPMENT ORDERS INDEX
AVERAGE 1922,24 = 100
FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION
BUILDING CONTRACTS
TOTAL VALUATION IN 37 STATES
COMPILED BY F.W. DODGE CORP.
COMMODITY WHOLESALE PRICE INDEX
1926 = 100
COMPILED BY U.S. BUREAU OF LABOR
PIG IRON PRODUCTION
AVERAGE DAILY OUTPUT
BLAST FURNACE RATE
COMPILED BY STEEL
INDUSTRIAL PRODUCTION INDEX
ADJUSTED FOR SEASONAL VARIATION
AVERAGE 1923,25 = 100
COMPILED BY FEDERAL RESERVE BOARD
COMMERCIAL INSOLVENCIES AND LIABILITIES
IN UNITED STATES
COMPILED BY R.G. DUN & CO.
LIABILITIES
FAILURES
COPYRIGHT 1939 STEEL
FREIGHT CAR AWARDS
COMPILED BY STEEL
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW-VOLUME MONTHS MORE CLEARLY
THOUSANDS OF CARS
THOUSANDS OF TONS
MILLIONS OF DOLLARS
THOUSANDS OF GROSS TONS
PER CENT
LIABILITIES IN MILLION DOLLARS
NUMBER OF FAILURES IN THOUSANDS
PER CENT OF OUTPUT TO TOTAL CAPACITY
NUMBER OF CARS

Forum on RE-EMPLOYMENT



Much is being said about increased activity in the building trades. In the realization that there is great need for more and better housing, various governmental agencies have been and are busying themselves to stimulate building—directly through initiation of projects, also indirectly through easing of credit to private builders.

As an experienced interpreter of what the building situation is and can be, and what it means in terms of employment, STEEL presents Marshall Adams, merchandising consultant, Cincinnati and New York. Mr. Adams was for many years advertising and sales promotion manager of Westinghouse Electric & Mfg. Co., and of American Radiator Co. As managing director of the Producers' Council, he recently organized and directed a successful nation-wide campaign to promote building.

Mr. Adams says: "Many of our towns and cities need thorough rebuilding. Many are poorly planned. Many have blighted areas—large areas which for considerations of decency and health—to say nothing of beauty—should not be allowed to exist as they are."

—The Editors

■ INCREASE in construction of residential units in 1939 over 1938, will provide jobs for 425,000 men for a year, including construction at the job, fabrication in factories, and production of raw materials in mine, mill and forest. This increase in construction, and the attendant re-employment, is the result of three forces that should be analyzed when considering the problem of re-employment in the construction industry.

The first of these forces is necessity. There are many and varied estimates of the need that exists for new homes and new dwelling units. Few of them mean anything to the average man, but all of us know that there are fires, tornados, and also disintegration that comes with age and wear and tear. These things have been going on at their usual rate in the last ten years, while new construction has been going on at a reduced rate. Hence there is a tremendous potential of employment in the need for new and renovated structures.

Probably the strongest of these forces for re-employment in the building industry is the favorable financing situation. Never in the history of this country has it been as easy to finance new construction and remodeling, nor have money rates been so low and terms so easy.

Under provisions of the National housing act and under arrangements made independently by financial institutions, money for repairs is available almost everywhere at a time payment rate approximately two-thirds the rate of other days. With a down payment as low as ten per cent the transaction may be financed over a period of at least three years, and in some cases five.

Thousands of banks have learned that the "small man" with a good credit rating and ability to pay is to be trusted to meet obligations of this kind, and that losses under these modern provisions are lower than when larger down payments and shorter terms were in vogue. They have also learned that these provisions are an aid to the renting of the money of which they have so much and which they are so anxious to put to work.

In the new construction field there have been similar reductions of rates, extension and easing of terms. Those who several years ago said that the 80 per cent amortizing mortgage was economically unsound are now making 90 per cent loans. They are finding that even with the simplest of credit investigations before making the loan, these mortgages are probably the most profitable investments in their portfolios.

"Package" Home A Factor

The third force that is bringing about an increase in residential construction is the "package" home or residential unit recently developed by designers and engineers. There is no more comparison between the modern house or apartment and those of 20 years ago, than there is between automobiles of these two periods. Better appearance; more efficient use of space; provisions assuring comfort, health and convenience; better equipment and lower operating and maintenance cost; are among many recent advantages.

With these three powerful forces in operation the question naturally arises: "Why doesn't construction in the residential field increase more rapidly and to a greater extent?" Here is the simple answer. There is very little comprehensive merchandising behind either the idea

or the product. This becomes acutely evident when you compare what little there is, with merchandising behind such commodities as automobiles, travel, entertainment, and various appliances—all of which are being sold to the same people who might build, buy or modernize a home.

It has cost other industries millions to create a situation similar to that now existing in the residential field: Namely, an actual need; easier and cheaper financing; and a superior product. The building industry as a unit did not spend the money to create this situation and is not spending the money to capitalize on it because there is no such thing as a building industry. There are pieces of a building industry such as product trade associations; labor unions; contractors' and builders' organizations; dealer and wholesaler groups; organizations of real estate people; and units composed of financial institutions. But there is no building industry and perhaps there never will be. At least there will not be until a community of interest is developed which will overshadow the present conflicts of interest between the various groups which might reasonably be expected to unite in some kind of organization, behind some kind of program.

Suppliers Cannot Promote Housing

There is, however, one partly organized group that might be called an industry under the common definition which is: "A group that manufactures and sells something." This group is composed of builders who manufacture and sell complete houses. They are the only ones now in a position to merchandise the finished product to the consumer. They provide the plans, assemble the products, fabricate the houses and conduct the sales activity necessary to sell them. Their activities are, however, confined to their own individual localities.

The fact that there is no national building industry is not strange to one who has examined the situation. Only a few builders are organized even on a forum basis. National activities of trade associations are confined to products which in most cases represent only a small part of a complete house.

Certain groups, led by lumber interests and some manufacturers who can furnish a sizable portion of the products going into a complete house, are carrying on merchandising activities in connection with complete homes. They are making but little impression on the whole market, however.

A prevalent idea is that national manufacturers of building materials and equipment should catch

©*Bachrach*

Marshall Adams
Merchandise Consultant
Cincinnati

the vision and merchandise to the public the idea of home ownership—in other words the completed product. The reason why they have not done this becomes obvious when the facts are examined.

In the first place there are no large national manufacturers in a position to furnish all materials and equipment for a complete home. Even if there were, the fact still remains that at least half of the selling price of a house is represented in land cost, labor on the job, selling cost and profit. Even in the case of a complete wooden structure, parts like windows, doors and millwork have different sources other than those of the raw lumber, while the bath, kitchen and heating equipment comes from without that industry.

Furthermore, among large manufacturers of building material and equipment there are few if any whose interests are primarily in the building field. In the case of one of the largest manufacturers of building material, nearly 70 per cent of sales are in the industrial field. In the case of one of the largest manufacturers of equipment for buildings, total sales of material in this field represent only about 35 per cent of its business. Attention that these manufacturers give to the building field naturally is only in proportion to their sales possibilities in it.

To make a long story short, the present practical approach to creating re-employment by increasing construction and remodeling in the building field should begin by recognizing the essentially local nature of the building industry. This has possibilities of development while other situations are evolving. Initiative for building comes primarily from a person or group of persons wishing to modernize; build and occupy; build and sell; or build and rent a building. The only others whose interests are definitely affected are other citizens of the community in which the initiative is taken. Therefore the group behind which it seems most practical to mobilize in a move to create jobs in the building field, is that included in a town, city or a trading area.

Many of our towns and cities need thorough rebuilding. Many are poorly planned. Many have "blighted areas"—large areas which for considerations of decency and health—to say nothing of beauty—should not be allowed to exist as they are. But most important of all is the overall interest of residents of the community. The clearing up of such situations will benefit everyone through the tremendous local turnover of dollars incidental to buildings and remodeling activities.

Many Jobs Can Be Created

It has been reported that in one city of about 450,000 there are 78,000 persons more or less dependent on the building industry. If this city were faced with the possibility of attracting a factory that would employ 5000 people, the chamber of commerce, luncheon clubs, newspapers and banks would all co-operate in going after it. But this same city has no organized program for keeping workers in its "building factory" busy.

Everyone is familiar with the "Clean Up—Paint Up" campaigns inaugurated several years ago, particularly in small towns. Few are familiar with the fact however that these same campaigns were put on in at least 7000 towns in 1938. While there is little comparison between a "Paint Up—Clean Up" campaign and a "Rebuilding Program" for a town or city, they have demonstrated that once educational work has been done and benefits of a community activity have been felt, it takes comparatively little push to keep it going. Communities build parks, libraries, municipal buildings. Why not rebuild themselves?

Since there is no existing national leadership of an industry character in these matters, it remains for each individual community to consider its own employment problem and the possible effect of a "Rebuilding Program" on it and upon its general prosperity. While it is unlikely that there will be any national movement in this connection, it is very likely that any community actively exploring the subject will receive the active support and co-operation of those national factors which are loosely spoken of as composing the non-existent building industry.

Zinc-Dust Paints

For Improved Maintenance of Metal Surfaces

This 40-ton gantry crane is primed with zinc-dust zinc-oxide paint and finished with aluminum

Due to a galvanic action similar to that exerted by zinc galvanizing, zinc-dust paints deter rust formation. Their excellent distensibility, great adherence and high hiding power make them valuable as a protecting finish for all iron and steel surfaces

■ MILLIONS of dollars are spent annually for maintenance of metal buildings and outdoor metal structures. Zinc-dust paints have shown definite economy when used on such applications. These paints are formulated with metallic zinc powder, a gray pigment distilled in furnaces specially designed and operated for its production. This powder weighs 58.81 pounds per solid gallon and is in so fine a state of subdivision that 99 per cent of standard zinc dust, No. 22, will pass through a 325-mesh screen.

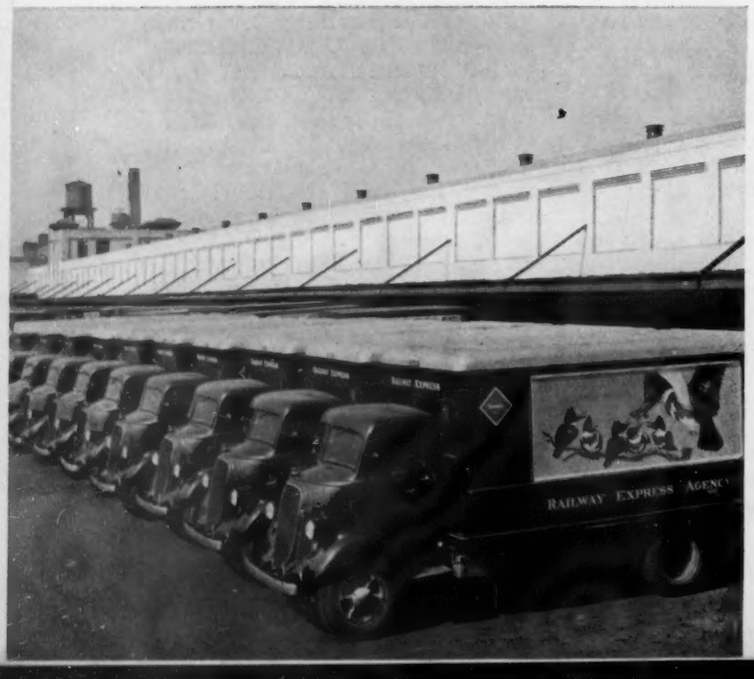
Desirable applications include galvanized iron, steel and zinc sheet, shop coating of structural steel and iron, protection of smokestacks and hot surfaces in general, as primers under aluminum and other types of finishing paints, and in combination with aluminum where the sheen of aluminum and the rust inhibitive properties of zinc dust produce an excellent one-coat job.

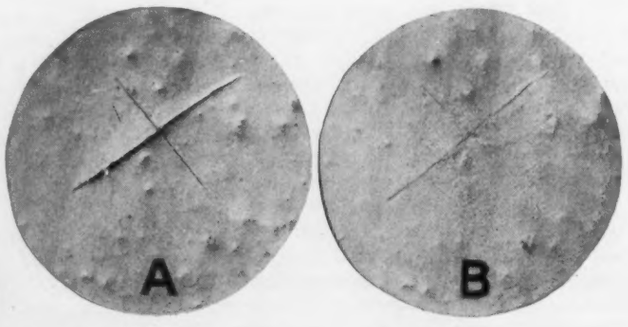
Zinc galvanizing actually prevents rust formation due to the galvanic action it exerts. This same characteristic of zinc in galvanizing is present in some degree in connection with zinc-dust paint.

The excellent plastic properties of zinc dust paint film after exposure for one year is demonstrated in accompanying illustrations where A shows a cut in paint film typical of that in a plastic material, and B shows paint film molded back into place and the cut practically healed. This shows how zinc dust paints retain their distensible properties. Properly formulated, zinc dust paint film has slight chalking tendencies, drives to a firm film that holds its color, is not "tacky" and therefore sheds dirt well, and does not check or crack even after prolonged exposure.

These paints have excellent hiding power and high spreading rates. One coat obscures a background of any color with an attractive battleship-gray finish. Considerable amounts of other pigments may be added without materially affecting

Abstracted from material for a booklet to be published jointly by New Jersey Zinc Co., New York, and paint manufacturers.





Above, A shows cut typical of that in a plastic material. B shows paint film molded back into place and cut practically healed. Both after one-year's exposure. Left, Railway Express Agency, one of world's largest fleet owners, has standardized on zinc-dust paint to prime the galvanized steel outsides, insides, tops and understructures of its more than 10,000 delivery trucks

the hiding power. They have a high spreading rate, one gallon covering 800 square feet or more.

Properly prepared zinc-dust paints may be applied by brush or spray methods. Their nontoxic nature particularly commends them for spray application.

A proper protective paint for galvanized iron and steel surfaces requires the coating be distensible and to retain this property over long periods of exposure to weathering. Also, it must adhere uniformly and firmly to the galvanized surface. Zinc dust paints meet these requirements well, especially due to the affinity between the zinc dust and the zinc surface of the galvanized base material.

Primers for iron and steel surfaces particularly must be efficient rust inhibitors if low maintenance is to result. Exposure tests with zinc dust paints have resulted in thorough demonstration of the excellence of zinc dust paints for this application.

In addition, surfaces allowed to weather for an inordinately long period of time require only moderate preparation and cleaning for repainting. Where most protective paints, under such conditions, would require extensive chipping, scratch brushing and other preparation before repainting, the zinc-dust coat requires practically no mechanical preparation over that of merely cleaning the surface.

Ideal For Shop Coating

As a shop coat for structural and other iron and steel work, zinc-dust paints appear particularly ideal. Often the shop coat of paint is called upon to protect the surfaces of steel for long periods of time, up to two years in many instances. During this time, the paint must exhibit not only high exposure to weathering but great abrasive resistance. Also it must protect bared metal from corrosion if the surface becomes abraded.

Then when finish painting is done, the shop coat must serve as an effective primer and anchor for the succeeding coats. Actually, qualities of the shop coat directly determine the life and durability of the entire finish. So its importance is tremendous.

Interest is growing rapidly in use of zinc-dust paints for shop coating purposes. Both the 80 per cent zinc dust, 20 per cent zinc oxide as well as the 50 per cent zinc dust, 30 per cent iron oxide, 20 per cent zinc oxide paints lend themselves to shop coat formulations.

In a series of tests on three I-beams to compare protective properties, red lead was found to give a value of 12 months; iron oxide, zinc oxide 19 months; and zinc dust, iron oxide, zinc oxide gave more than 24 months. This was the time that elapsed before extensive scratch brushing was indicated as being necessary before repainting.

Forms Galvanized Coating

Zinc dust incorporated in the softer, heat resistant types of quick-drying resin vehicles, particularly those of the alkyd variety, provide a particularly adherent and protective coating for hot surfaces. Where some vehicles disintegrate causing embrittlement of the paint and subsequent flaking, zinc-dust paints tend to maintain their distensibility for a long period of time. In fact, after exposure to heat has disintegrated the vehicle, zinc dust continues to adhere firmly to the original metal due to the fact that under these elevated temperatures the zinc dust actually forms a galvanized coating.

Zinc-dust paints appear a most satisfactory primer for aluminum paints and other types of finishing coats. Zinc-dust paint is sufficiently flexible to contract and expand with the metal as well as to afford excellent anchorage to subsequent coats.

While aluminum paint is used as a finish coat for metals essentially because of the sheen it imparts to the finished job, it is recognized that it does not have particularly good rust inhibitive properties. Aluminum is recommended for application over a good rust inhibitive primer. Characteristics of zinc dust paints appear particularly suitable for a primer under aluminum finish paints, whether on sheet steel, black iron or galvanized surfaces.

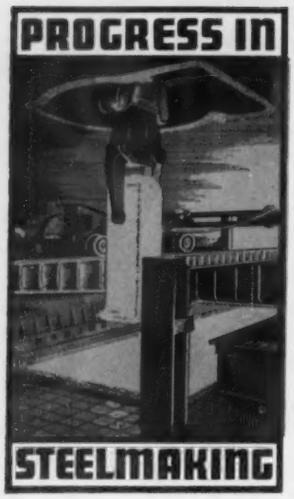
Zinc-dust paint is widely used in electric power line equipment

When zinc-dust paints are used on building structures, it sometimes is desirable to color the paint to meet different appearance requirements. Since metallic zinc dust possesses exceptionally high hiding power but low tinting strength, zinc-dust paints can be tinted with addition of only a small amount of colored pigment in a wide range of attractive colors, as well as black, while retaining the metal protective features of both the zinc dust and zinc oxide. Such colored zinc-dust paints may be used as self-primer two-coat systems, thereby attaining all the desirable properties of zinc, paint or as a one-coat job to obtain both the desired color effect and the rust inhibitive properties combined.

Such paints are excellent from

(*Please turn to Page* 78)

Zinc-dust aluminum paint on rolling grilles in San Antonio, Tex., is exposed to both weathering and abrasion. Photo courtesy Kinnear Mfg. Co., Columbus, O.



Open-Hearth Bottoms

New bottom shows no expansion during heating-up time and break-in periods. Savings in installation cost and furnace time total 48.4 per cent compared with recent installations of conventional type. During one week, makes 19 heats averaging 8 hours, 45 minutes from tap to tap and 15.43 gross tons per hour

By ALEX M. MORTON
Superintendent Construction
Pittsburgh Steel Co.
Monessen, Pa.

■ AT PITTSBURGH STEEL, a more refractory bottom has been installed to provide complete drainage of non-ferrous as well as ferrous metals and slag from the hearth, thereby reducing the possibilities of injurious bottom boils as well as installation cost compared with a conventional bottom. Such a bottom was installed in No. 5 open hearth furnace, lit Dec. 9, 1938. It completed its run April 8, 1939.

The brick subhearth on this furnace was constructed as an inverted semielliptical arch that conformed to the general lines of the conventional bottom, with a drop of 6 inches from end slopes to the tap hole and 2 inches from front to back. The magnesite working hearth was 2 inches thick on banks and bottom. Tap hole was constructed as its bottom conformed to surface of brick in the subhearth. This permits complete drainage.

Subhearth consists of a 3-inch layer of insulation followed by 12½ inches of clay brick, a 9-inch soldier course of chrome brick, and a 9-inch soldier course of chrome-magnesite brick. Both the chrome and chrome-magnesite brick are of bonded ring construction with a dipped and rubbed joint. Base for the finished contour of the bottom was cut out in the clay brick, 18 inches below the finished line to allow for the two rings of basic brick. All brick used was standard 3-inch series, laid in special chrome cement. No allowance was made for expansion in any part of the hearth.

Abstracted from paper presented at Open Hearth and Blast Furnace conference, Cleveland, April 26-28.

Elapsed time for heating up and burning in of hearth is shown in Table I.

Table I

Heating up with wood fire	35 hrs. and 30 mins.
Heating up with gas on	18 hrs. and 45 mins.
Total time heating up	54 hrs. and 15 mins.
Burning in grain magnesite	48 hrs. and 30 mins.
Total elapsed time from cold furnace to charge	102 hrs. and 45 mins.

During the heating-up time and burning-in periods, absolutely no expansion could be detected in any part of the hearth.

Table II

	Per Cent
Silicon	2.64
Ferrous Oxide	7.74
Ferric Oxide	8.01
Aluminum Oxide	3.61
Calcium Oxide	1.10
Magnesium Oxide	77.64

Material used in burning-in the bottom included 26,000 pounds of 86-per cent magnesite and 3675 pounds of 14-per cent bar-mill scale for the bottom, with 26,000 pounds of magnesite for the banks.

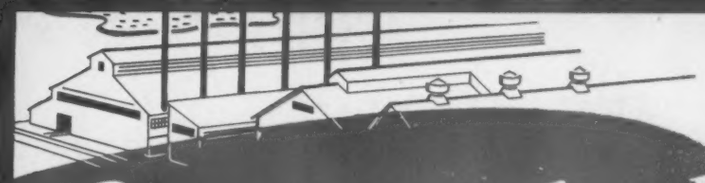
Both magnesite and mill scale were ground together in a dry pan so all the first shot passed through No. 20 mesh, and subsequent shots averaged approximately 40 per cent fines. It was planned to cover the bottom and banks with this mixture to an even depth of 2 inches. However, during the heating-up period, the brick ribs on the front and back banks spalled, leaving little purchase for the first shot of magnesite which slipped further down on the banks than was intended. After repeated attempts at building up the banks, it was decided to go ahead on the bottom and to make up the banks with part of the first heat in the furnace. This procedure proved successful and an additional 26,000 pounds of magnesite, as shown above, was used for this work.

Cores taken from the back bank and bottom during the burning-in period appeared when cold to be somewhat lacking in bond compared with samples taken from bottoms in the past, which incorporated a large percentage of low melting

(*Please turn to Page* 77)

Table III

Total number of heats	267
Average gross tons per heat	135.29
Total tonnage for run (gross tons)	36,127.70
Gross tons per hour, tap to tap	13.33
Gross tons per 1000 square feet of hearth area	21.67
Yield, per cent	92.65
Charge { Hot metal, per cent	55
Charge { Scrap, per cent	45
Average time per heat, bottom delay for run	2.7 min.
B.T.U. per gross ton of ingots, using producer gas	4,140,000



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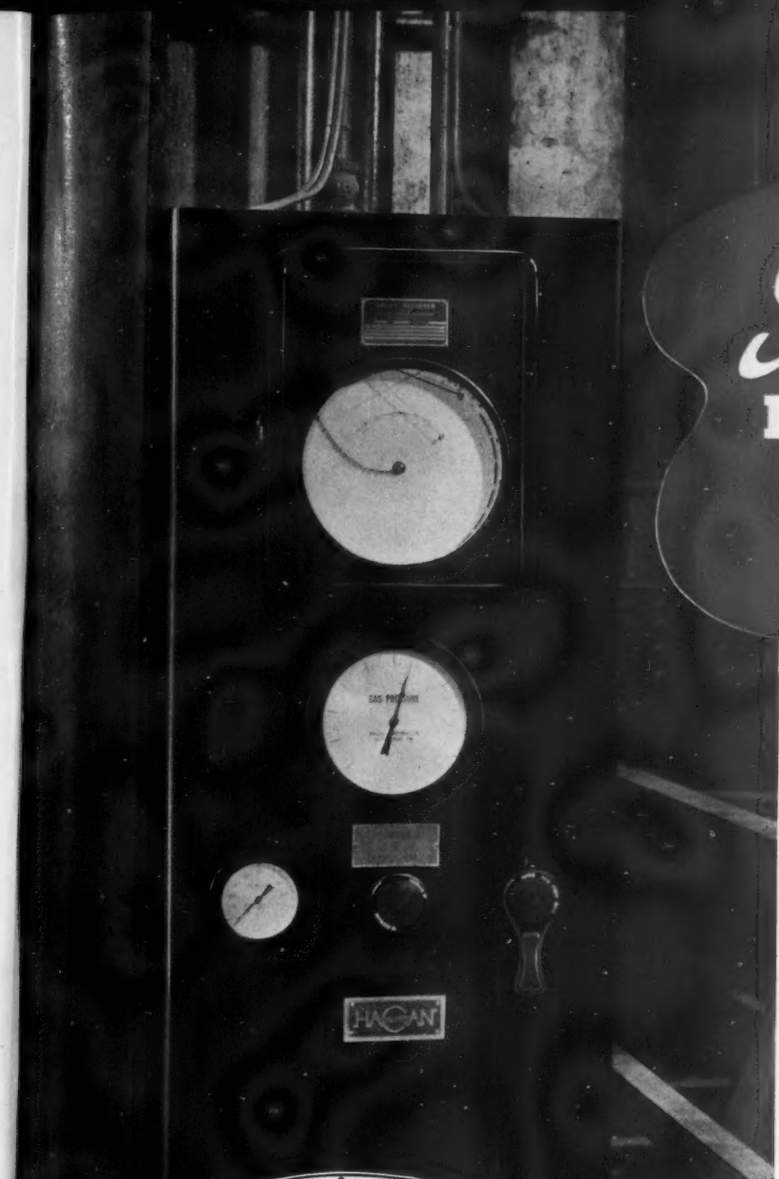

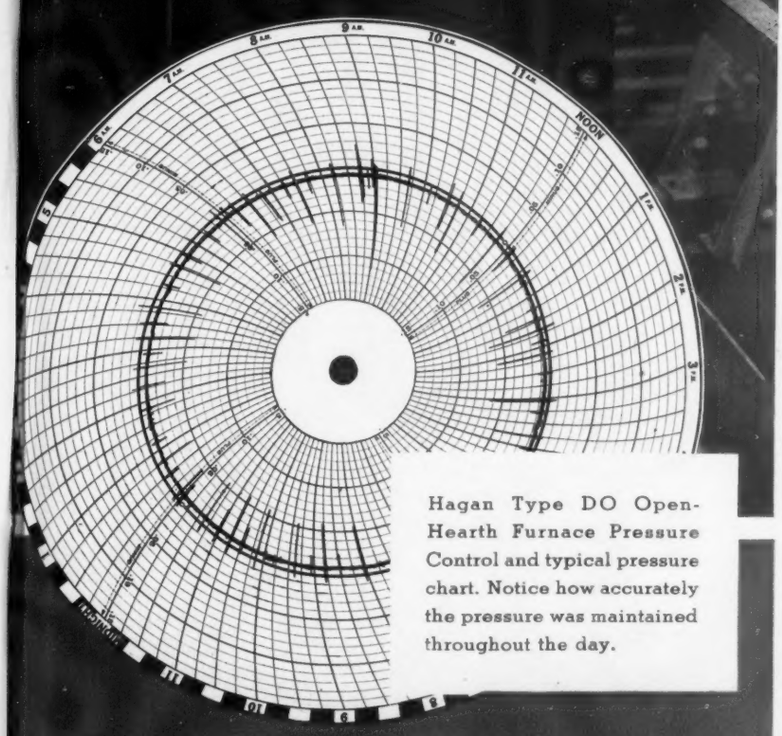

Hagan Type DO Open-Hearth Furnace Pressure Control and typical pressure chart. Notice how accurately the pressure was maintained throughout the day.

Hagan Open-Hearth Furnace Pressure Control paid for itself in 65 days

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Hagan Automatic Furnace Pressure Control was installed on an open-hearth furnace in a large steel mill in the Pittsburgh district. Tonnage was increased approximately 5% per hour due to more even operation. Savings in fuel alone amounted to more than $13 a day. At this rate the equipment would pay for itself in 65 days and in a short time pay for all installation costs. Uniform furnace pressure day in and day out helped assure uniform quality steel—at reduced costs. Similar results are being obtained from Hagan Control installations in numerous other mills.

Hagan also makes dependable, accurate control for soaking pits, slab and billet heating furnaces and any other application where the control of furnace pressure, fuel-air ratio and volume are important problems. Our engineers will welcome an opportunity to look over your mill and make recommendations that will lead to lower production costs. Write or call.

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HAGAN *Automatic* COMBUSTION CONTROL

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Base Confidence on Peace-Time Activities

(*Concluded from Page 35*)

will not hesitate to purchase expensive machine tools suited to handle its difficult and exacting machining operations, Mr. Ward—with the help of motion pictures and slides—went into detail on these operations. Cutting speeds of 700 to 800 feet per minute are common on duralumin parts, 200 feet per minute being employed successfully on harder materials. Grinding limits within 0.0002-inch and machining limits within 0.0005-inch are demanded on many of the parts.

No finer aircraft engines are being built anywhere in the world today, said Mr. Ward, than are being manufactured right here in the United States. European experts are flocking over here to find out how it is done. Quality of American engines is due to a great extent to the fact that accurate fit and complete interchangeability of parts is made possible—without any hand finishing and fitting—by the latest developments in the American machine tool industry.

Other speakers during the convention included: Tell Berna, general manager of the association, Cleveland, who in the absence of B. P. Graves, director of design, Brown & Sharpe Mfg. Co., Providence, R. I., also read the latter's paper on "Electrical Motor and Control Application to Machine Tools;" T. Heberton Doan, president, Foote-Burt Co., Cleveland; L. W. Scott Alter, president, American Tool Works Co., Cincinnati; Walter W. Tangeman, vice president, Cincinnati Milling Machine Co., Cincinnati; William E. Kelly, president, Machinery and Allied Products institute, Chicago; and Charles J. Stilwell, newly elected president, Warner & Swasey Co., Cleveland.

Industrial Architecture Joins Beauty, Efficiency

■ *Industrial Architecture of Albert Kahn Inc.*, by George Nelson; cloth, 176 pages, 9 x 12 inches; 200 illustrations, diagrams and floor plans; published by Architectural Book Publishing Co. Inc., New York; supplied by STEEL, Cleveland, for $6; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London S W. 1.

Factory building of the last century has become industrial architecture today. This has resulted from higher aesthetic standards and also from fundamental changes within the factory itself.

This volume presents some 60 case histories, the basic problem of each stated in brief and simple terms and text and illustrations presenting the solution. Many details evolved by Albert Kahn Inc. are shown, how to decrease construction costs while increasing the efficiency of buildings. Emphasis is placed on the fact that it is possible to construct an attractive and skillfully planned factory at no greater cost than an unattractive, inefficient one.

The volume is of interest to the architect, the engineer and the industrialist, showing how architectural beauty and efficient planning are combined. The illustrations are of the highest class and the entire format is attractive. A cross section of industrial architecture is presented, full of suggestions to those interested in construction.

Issues Code For Overhead Track Systems

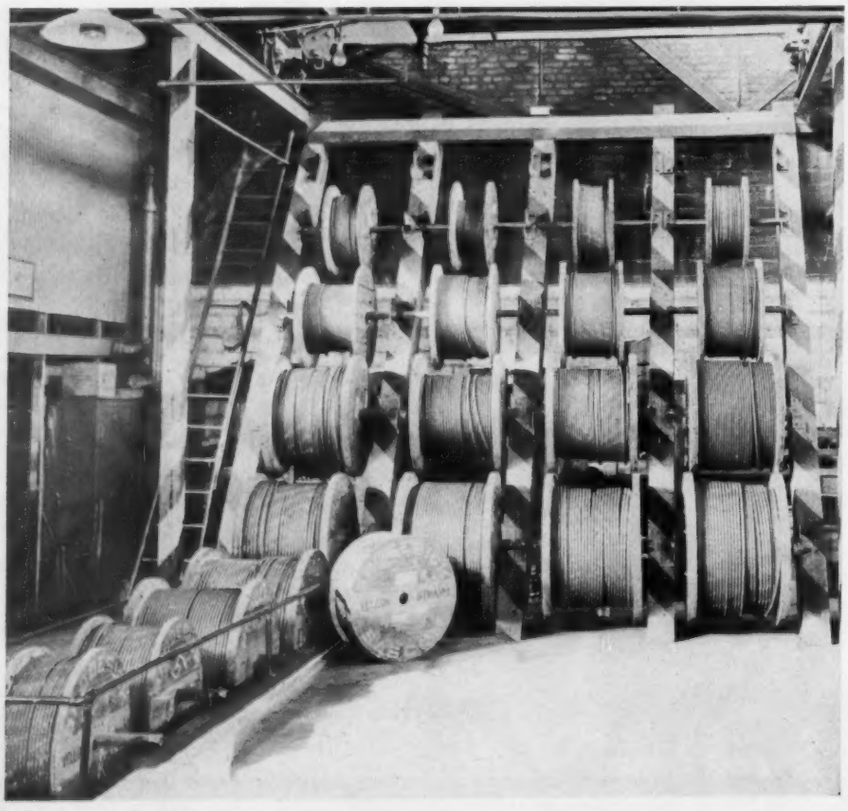
■ Monorail Manufacturers association, 165 Broadway, New York, has published a leaflet, "Specifications For Overhead System", which covers the following: Extent of work (referring to contract), track, suspension fittings, manually operated trolleys or carriers, switches, cranes and transfer bridges, track openers or lift-out links, electrification, collector wheel or shoes, electric hoists, electric hoist and travel carriages, wiring and guarantee. The electric hoist section complies with specifications issued by the Electric Hoist Manufacturers association. Copies may be had by request.

Novel Storage For Ropes

■ How W. T. Walsh Equipment Co., Cleveland, simplified handling its stock of wire ropes is described in a recent issue of *The Yellow Strand*, house organ of the Broderick & Bascom Rope Co., St. Louis. As shown in the accompanying illustration, a specially constructed storage rack permits tiering of reels in such manner that each is in position to permit cutting of desired lengths of rope with a minimum of effort on the part of the operator.

A simple arrangement of a small overhead crane equipped with chain block makes lifting and lowering of reels a light task. A railed pit, formerly used for automobile service work, adjoins the rack and provides additional storage space for four good sized reels.

Among the advantages effected by this novel arrangement are the following: Rope may be cut without danger of kinking; each reel can be handled without disturbing any other reel; floor space is conserved and greater all-around neatness and efficiency are attained. Rack frames are painted in barber-pole stripes, which lends a colorful and attractive touch to the storage department.



This arrangement of wire rope stock may suggest possibilities to others with similar storage handling problems. Crane and chain block do the heavy lifting

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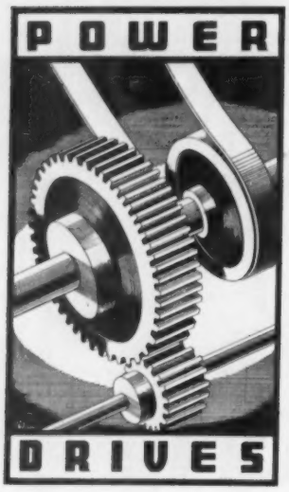

Flat Belt Ratings

Horsepower ratings for oak tanned, flat leather belting officially adopted by American Leather Belting association, Dec. 8, 1938, are presented here. Tables include factors to cover atmospheric conditions, type of service, kind of pulley material

By L. H. SKOUGOR
Research Engineer
American Leather Belting Association
New York

■ UNIVERSALLY recognized and authoritative data on flat leather belt capacities has been established by the American Leather Belting association to fill a long felt need for this important information.

In the past, the user and purchaser of flat leather belts has been left entirely on his own in designing belting for his individual applications. Few millmen have had the time and facilities to segregate from the numerous possible sources what could be considered a reliable and yet economical basis for leather belt ratings. Existent information in many instances was at some disagreement as to what constituted good belting practice. Theories set forth by older sources of information in many cases have been revised and disproved through practical application.

These new tables now make it possible for the designer and purchaser to set up his own specifications rather than segregate them from a number of recommendations. American Leather Belting association tables are based on the performance of modern and up-to-date belting. They are not based on one particular authority's theory but are a correlation of scientifically measured tests and field data.

Table I lists horsepower transmission capacities for belts 1 inch in width at a varying speed, with the same given large-size pulley throughout the tests. The tests were run at Cornell University by Ralph Jones on most up-to-date and modern equipment. All variables were measured carefully rather than attempting to use any theoretical shortcuts or computations. It was a surprising thing that many of the existent formulas and theories concerning these variables were found to be inaccurate when checked against actual measurements. The figures in this table do not represent peak load ratings, but are based on proper tensions and factors of safety. Thus, when corrected through the factors in Tables II and III, a properly designed drive will result. It will be noted that the horsepower transmitted per inch of width increases with the speed of the belt.

With the work in Table I completed, it was necessary to establish a factor to compensate for the variables introduced, such as changing the effective area. These same tests therefore were run with varying pulley diameters and center-to-center distances resulting in the correction factors shown in Table II.

Table I. Horsepower Per Inch of Width

Belt Speed Feet Per Min.	SINGLE PLY *11/64" Medium	SINGLE PLY *13/64" Heavy	DOUBLE PLY *18/64" Light	DOUBLE PLY *20/64" Medium	DOUBLE PLY *23/64" Heavy	TRIPLE PLY *30/64" Medium	TRIPLE PLY *36/64" Heavy
600	1.1	1.2	1.5	1.8	2.2	2.5	2.8
800	1.4	1.7	2.0	2.4	2.9	3.3	3.6
1000	1.8	2.1	2.6	3.1	3.6	4.1	4.5
1200	2.1	2.5	3.1	3.7	4.3	4.9	5.4
1400	2.5	2.9	3.5	4.3	4.9	5.7	6.3
1600	2.8	3.3	4.0	4.9	5.6	6.5	7.1
1800	3.2	3.7	4.5	5.4	6.2	7.3	8.0
2000	3.5	4.1	4.9	6.0	6.9	8.1	8.9
2200	3.9	4.5	5.4	6.6	7.6	8.8	9.7
2400	4.2	4.9	5.9	7.1	8.2	9.5	10.4
2600	4.5	5.3	6.3	7.7	8.9	10.3	11.0
2800	4.9	5.6	6.8	8.2	9.5	11.0	12.1
3000	5.2	5.9	7.2	8.7	10.0	11.6	12.8
3200	5.4	6.3	7.6	9.2	10.6	12.3	13.5
3400	5.7	6.6	7.9	9.7	11.2	12.9	14.2
3600	5.9	6.9	8.3	10.1	11.7	13.4	14.8
3800	6.2	7.1	8.7	10.5	12.2	14.0	15.4
4000	6.4	7.4	9.0	10.9	12.6	14.5	16.0
4200	6.7	7.7	9.3	11.3	13.0	15.0	16.5
4400	6.9	7.9	9.6	11.7	13.4	15.4	16.9
4600	7.1	8.1	9.8	12.0	13.8	15.8	17.4
4800	7.2	8.3	10.1	12.3	14.1	16.2	17.8
5000	7.4	8.4	10.3	12.5	14.3	16.5	18.2
5200	7.5	8.6	10.5	12.8	14.6	16.8	18.5
5400	7.6	8.7	10.6	12.9	14.8	17.1	18.8
5600	7.7	8.8	10.9	13.1	15.0	17.3	19.0
5800	7.7	8.9	10.9	13.2	15.1	17.5	19.2
6000	7.8	8.9	10.9	13.2	15.2	17.6	19.3
Minimum Pulley Diameters — Belts Under 8" Wide	3"	5"	6"	8"	12"	20"	24"
Minimum Pulley Diameters — Belts 8" and Over Wide	5"	7"	8"	10"	14"	24"	30"

These are the minimum allowable pulleys for the above thickness belts.

*NOTE: See Table IV.
For Belt Speeds over 6000 feet per minute, consult a leather belting manufacturer.

Table II. Correction Factor for Center Distance and Small Pulley Diameter

Diam. Small Pulley, Inches	Center Distance in Feet — Up to 4' Tight Side Above	Up to 4' Tight Side Below	6' Tight Side Above	6' Tight Side Below	8' Tight Side Above	8' Tight Side Below	10' Tight Side Above	10' Tight Side Below	12' Tight Side Above	12' Tight Side Below	15' Tight Side Above	15' Tight Side Below	20' Tight Side Above	20' Tight Side Below	25' and Over Tight Side Above	25' and Over Tight Side Below
3	.45	.45	.46	.47	.47	.48	.47	.49	.48	.50	.49	.52	.48	.54	.48	.55
4	.53	.53	.54	.55	.55	.57	.56	.59	.57	.61	.58	.63	.59	.65	.59	.66
5	.59	.59	.60	.62	.62	.64	.63	.66	.63	.68	.65	.70	.66	.72	.66	.74
6	.62	.62	.63	.65	.65	.68	.66	.70	.67	.72	.68	.74	.69	.76	.70	.78
8	.66	.66	.67	.69	.69	.72	.70	.74	.71	.76	.72	.78	.73	.80	.74	.82
10	.68	.68	.70	.71	.71	.74	.73	.77	.73	.79	.75	.81	.76	.83	.77	.85
12	.70	.70	.72	.74	.73	.77	.75	.79	.76	.81	.77	.83	.78	.86	.79	.88
15	.73	.73	.74	.76	.76	.79	.77	.82	.78	.84	.80	.86	.81	.89	.82	.91
18	.75	.75	.76	.78	.78	.81	.79	.84	.80	.86	.82	.89	.83	.91	.84	.93
24	.77	.77	.79	.81	.81	.84	.82	.87	.83	.89	.85	.92	.86	.94	.87	.96
30	.79	.79	.81	.82	.82	.86	.84	.89	.85	.91	.87	.94	.88	.96	.89	.98
36	.80	.80	.82	.84	.83	.87	.85	.90	.86	.92	.88	.95	.89	.98	.90	1.00

Consider gravity idler and pivoted motor drives with tight side of the belt next to the pivot point as having 25 foot centers. For pivot base drives where tight side of the belt is away from the pivot point, do not use these tables but consult a Leather Belting manufacturer.

These tests also were run through measurements rather than using any theoretical formulas or short a practical yet scientific series of cuts. It will be noted that when gravity idlers and pivoted motor bases are used it was found that the factor for center line distances of 25 feet and over can be substituted for the effect of controlled tensions in pivoted bases and increased affective area of the gravity idler.

By setting up Tables II and III as correction factors, a more concise and flexible table is the result. The requirements of various industries often introduce adverse conditions that must be taken into consideration. These values cannot be extracted from factors as represented in a laboratory test.

It is necessary to belt a drive for the peak loads that will be encountered. The nameplate rating of a motor is not always a true indication of the peak loads that may be met. Correct overload capacity and torque characteristics of various motors are not always available to the millman. To insure against under-belting and premature belt failure, overload ratings of the motor, atmospheric conditions, service, etc., must be brought into the calculation to assure satisfactory belt performance. It is fully realized that conditions may exist in isolated cases which may not be covered by these tables. Exceptions must be made in those instances.

It is important that in no instance should a belt rating be taken from any one table without using the proper correction factors from the other two tables to compensate for the individual conditions surrounding the particular application.

Example No. 1

Problem: Select belt for following drive: Motor, 10 horsepower, line start, induction type; pulley 6 inches diameter x 6¾ inches face, fiber; compressor, started automatically against pressure; pulley 30 inches diameter x 6½ inches face; conditions, tight side of belt below, pulleys 6 feet center to center, center line approximately horizontal, important refrigeration service, normal atmospheric conditions.

Selection of factors: Belt speed 6 x 3.14 x 1750/12 = 2750 feet per minute; from Table I, light double belt suited for 6-inch diameter pulley; from Table I, light double belt will transmit 6.7 horsepower per inch of width at 2750 feet per minute; from Table II, factor for center distance and small pulley diameter is 0.65; from Table III, atmos-

(*Please turn to Page 77*)

Table III. Service Correction Factors

Atmospheric Condition	Clean, scheduled maintenance	1.2
	Normal	1.0
	Oily, wet or dusty	.7
Angle of Center Line	Horizontal to 60 deg. from horiz'l	1.0
	60 to 75 deg. from horizontal	.9
	75 to 90 deg. from horizontal	.8
Pulley Material	Fiber on motor and small pulleys	1.2
	Cast iron or steel	1.0
Service	Temporary or intermittent	1.2
	Normal	1.0
	Important or continuous	.8
Peak Loads	Light, steady load such as: Steam engines, steam turbines, Diesel engines, and multi-cylinder gasoline engines	1.0
	Jerky loads, reciprocating machines such as: Normal starting torque squirrel-cage motors, shunt wound D. C. motors, and single cylinder gasoline engines	.8
	Shock and reversing loads, full voltage start such as: Wound rotor (slip ring) motors, synchronous motors	.6

Table IV. Thickness Specifications for Flat Leather Belting

Approved and Adopted by American Leather Belting Association

Medium, Single Ply, 11/64" Average	"All thicknesses in this table are average thickness in inches, and should be determined by measuring 20 coils and dividing this total by the number of coils measured. In rolls of belting containing less than 20 coils, the average thickness should be determined by measuring all the coils in the roll. Allowable tolerances for all thicknesses plus or minus 1/64th-inch from above averages."
Heavy, Single Ply, 13/15" Average	
Light, Double, Ply 18/64" Average	
Medium, Double Ply, 20/64" Average	
Heavy, Double Ply, 23/64" Average	
*Medium, Triple Ply, 30/64" Average	Uniformity: No point in single belting shall be more than 3/64" thicker or more than 2/64" thinner than the average thickness. With doubles, the tolerances shall be 2/64" thicker or thinner than the average.
*Heavy, Triple Ply, 34/64" Average	

*Triple Ply: These are averages for general usage. Most triple ply belts are usually constructed for particular drive conditions. *Tolerances for Single and Double Ply Belts do not apply.* Consult a Leather Belting Manufacturer for specific information concerning thickness and construction of 3 Ply Belts.

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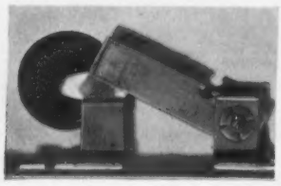
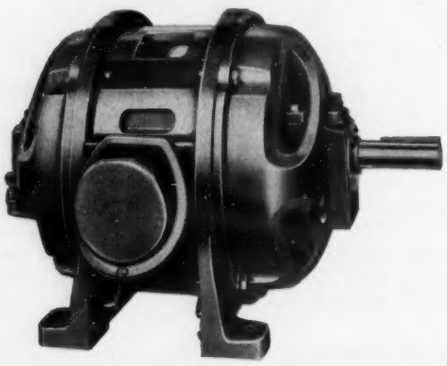


DIAMOND POINTED JAW WITH EXTENDED BLADE confines arc to noncurrent carrying areas . . . eliminates burning and beading. Saves dressing down, saves maintenance. Ask to see it demonstrated.

WESTINGHOUSE SAFETY SWITCH

EXTRA STRENGTH AT NO EXTRA COST IN WESTINGHOUSE MOTORS . . . Extra electric strength in Tuffernell Insulation, extra mechanical strength in rigid one piece frames. Ball or sleeve bearings free from lubrication grief.



ALL NECESSARY CONTROL AND PROTECTION IN ONE EASILY INSTALLED PACKAGE . . . The Westinghouse Combination Linestarter . . . Costs less to install . . . saves wiring, conduit, labor . . . simplifies inspection.

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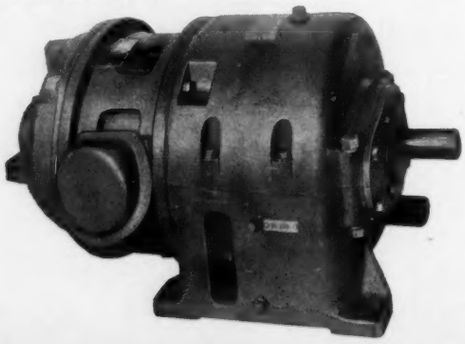
WESTINGHOUSE COMBINATION LINESTARTER

HIGH SPEED MOTOR EFFICIENCY FOR SLOW SPEED MACHINES . . . Now you can get the horsepower you want at the rpm. of the driven machine. Saves cost of separate mechanical units . . . simplifies installation, saves maintenance of belts, pulleys, sprockets or chain.



Westinghouse

W
WESTINGHOUSE ELECTRIC

Saves Two Thirds in Installation Cost

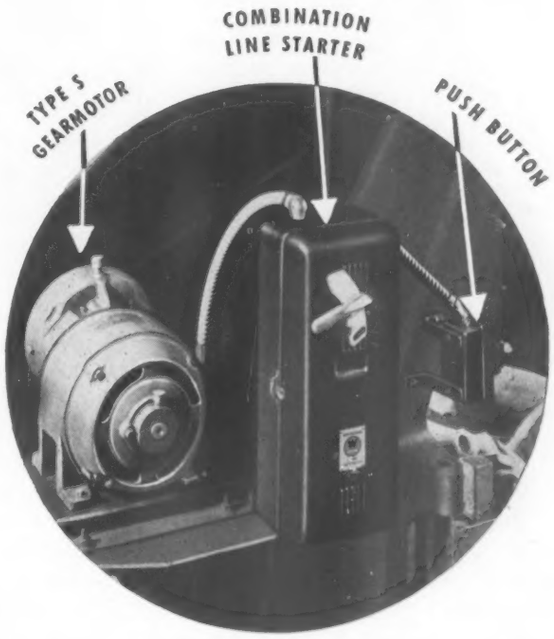
. . . AND GETS MODERN, COMPACT ASSEMBLY OF MOTOR AND CONTROL

A manufacturer in Pennsylvania planned to revamp his production to eliminate lifting and handling of parts — ironing out the wrinkles in the production line. Lineshafts were centered in the building and to hook these straightening machines to the lineshafts meant added expense.

Westinghouse gearmotors and Combination Linestarter control solved the problem . . . at one third of this estimated expense. Each machine is individually driven and controlled, and located independent of any other drive.

Note the simplicity and compactness of the gearmotor application. It delivers the required horsepower at slow speed with 98% of the efficiency the motor would have at standard speed.

Note, too, how pushbutton start and stop is at the operator's finger tips — how in one unit, mounted on the machine the Combination Linestarter provides fuseless circuit protection, undervoltage protection, motor running protection and magnetic starter.



Let Westinghouse help you modernize your motor and control the economical way. There is a Westinghouse electrical wholesaler, motor dealer, industrial agent or district office in all principal cities, ready to give you the benefit of Westinghouse research, engineering, and application. Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

J-90149

Motors and Control

Steel Engineers Inspect New Coke Plant, Blast Furnace in Detroit

■ INSPECTION of the blast furnaces and coke plant of the Great Lakes Steel Corp., Detroit, was made April 19 by the Detroit section of the Association of Iron and Steel Engineers, in company with members of the association from other districts and members of the Eastern and Western States Blast Furnace and Coke Oven associations.

Technical details of these new plants were outlined at an evening meeting following the inspection trip. Raymond M. Hughes, assistant chief engineer, and William J. Rees, mechanical engineer, of Great Lakes Steel, presented a paper dealing with features of the blast furnace. Mr. Hughes stated that Great Lakes, previous to building this furnace, had on Zug Island, about 3 miles from the steel plant, two blast furnaces. Doubling of open-hearth capacity necessitated an additional supply of pig iron. The new furnace was placed between the two previously existing furnaces, and the placing of the various auxiliaries in the available space presented many interesting problems.

Necessity for additional storage space for ore, as well as for coal for the new coke plant, was met by providing a new storage space south of the coke plant, and installing a trestle along the side of this space, continuing it along the river front to the old high-line. Both ore and coke thus are transferred without interference with transportation at ground level. Ore transfer cars are electrically driven, while coke transfer cars are propelled by a fireless locomotive.

Ore Handling Facilities

Two new ore bridges were installed at the old ore yard and two other bridges were moved to the new yard.

Placing of the new furnace between the two older furnaces required rearrangement of gas cleaning equipment on the existing "B" furnace, while the installation of electrical precipitators for cleaning the blast furnace gas to the degree required for coke oven heating, also presented a problem.

Zug Island site is mostly blue clay, through which runs a 30-foot strata of sand. Hard pan is usually 72-80 feet below yard level. Accordingly, piling is necessary. The equipment which had been cleared away from the new furnace site had presented no extreme loads, and had consequently been built on piles driven only some 35 feet to the sand strata. These old piles were pulled by a cable sling and suitable hoisting rig.

Due to the highly concentrated loads for the new furnace and its auxiliaries, it was decided to use step-taper piles, from 70 to 77 feet long. These piles consist of 10-inch pipe lengths welded together to form the bottom of the pile, with a top section, similar to the conventional sheet-encased concrete pile. This upper part is usually 30-35 feet long and is joined to the steel pipe by a special locking ring. After the pile is driven and inspected, it is filled with concrete.

This type of pile has been tested to carry 100 tons, more than twice its loading in this instance, and has proved economical where loads are heavy and concentrated. Under the furnace proper, the concrete piles are on 36-inch centers in both directions, and are topped by a 15-foot concrete slab. A total of 1409 piles of this type was used for the furnace and its auxiliaries.

Furnace Lines

There is 15 feet of bottom brickwork under the furnace hearth. The furnace is lined to a 25-foot hearth diameter, a 28-foot bosh, and a 19-foot 6-inch top. The bosh angle is 81 degrees 28 minutes 9 seconds, the inwall batter, 0.962 inches. The large bell is 14 feet 6 inches in diameter, and has a 53-degree angle. The small bell has a 6-foot diameter. Total height is 102 feet 8 inches from hearth level to the top of the flange on the large bell hopper. Volume of the furnace is as follows:

	Cubic feet
Hearth section	5494
Bosh section	5521
Stack section	29,580
Stockline section	1344
Total	41,939

The furnace top is equipped with a revolving distributor which is electrically interlocked with skip and bell hoists. The large bell is operated through positive, rigid linkage. Skip and bell hoists, as well as furnace control panels, are located at cast house level, the hoist house being partially under the skip bridge.

The skip hoist is of the geared type, driven by two 150-horsepower, direct-current motors, each directly connected to two 150-kilowatt generators driven by a single 400-horsepower induction motor. The equipment is operated under variable voltage control.

Furnace Auxiliaries

The stockhouse is composed of 19 ore and stone bins, one scrap bin, and two large central coke bins. It is served by scale cars of 200 cubic feet capacity.

Three hot blast stoves, 24 feet in diameter by 100 feet high, serve to heat the blast. They are lined with small checkerbrick, forming 1 15/16-inch square flues, and giving a total of 191,000 square feet of heating surface each. A continuous blast temperature of 1500 degrees Fahr., may be carried.

Each charge is composed of 38,800 pounds ore, 3400 pounds borings, 2200 pounds flue dust, 8400 pounds stone, and 17,100 pounds coke, totaling 69,900 pounds. The charging sequence is ore-ore-coke-coke-stone-borings and flue dust-coke-dump.

Essential details of the new coke plant were reviewed by Charles P. Betz, superintendent coke plant, Hanna Furnace division, and Phillip C. Vetter, engineer. They reported that the plant consists of two 65-oven batteries, by-product department, benzol plant, coal and coke handling systems and coal storage yard, located on Zug island, off the north shore of the Detroit river. It has a nominal capacity of 3300 tons of coal per day, and provisions have been made for the future installation of 20 additional ovens should they be desired.

Coal Handling

Due to the advantages of water shipment, an unloading dock and steel coal bin were constructed. From the bin, coal may be fed either to the preparation system or to the storage yard. Facilities are also provided to unload rail shipments. All handling is done rapidly in an efficient way by modern machinery.

The coal preparation system has a capacity of 500 tons per hour. Two breakers reduce the coal to a size under 1½ inches, which is then carried to four mixing bins by a shuttle conveyor. Mixer belts convey coal from the four storage bins to the conveyor feeding two hammer-mills, where the coal is further crushed so that 70 per cent passes through a ⅛-inch screen, and then carried to a storage bin. Two three-hopper charging cars are served from this bin.

Coke Ovens

The soil conditions of Zug island required the driving of piles wherever any considerable foundation load must be met. The basement pad, 3 feet thick, was laid on top

(*Please turn to Page* 63)

They put us in with the LIONS

The shop foreman gave Shell his toughest job... as a tryout!

IN up-state New York, there's a plant which has a shop foreman who operates on a pretty sensible principle when it comes to putting in a new oil.

He gives the newcomer the toughest job in the plant and lets him *prove* whether he's good or not. "Throwing 'em to the lions," he calls it.

The Shell man was no exception—and he welcomed the chance to prove the worth of Shell Lubricants under the toughest conditions.

This plant was working 18-8 chrome nickel on their automatic machines—and having plenty of trouble with these tough metals. The work was smoking, life of the tools was very short, and the finish in many cases was bad.

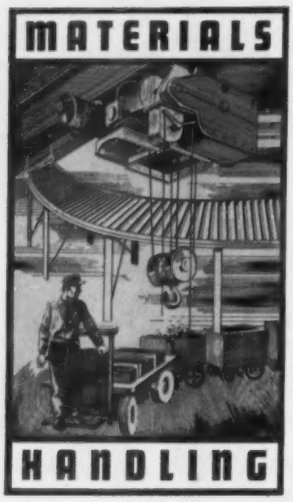
The Shell man went to work on these machines, conducting a series of experiments with the cutting oil. After he had completed his tests, he recommended to the foreman the correct type and grade of Shell Cutting Oil.

And the Shell man proved his product! No longer did the work smoke . . . finishes were smoother . . . yet the over-all cost of the Shell product was less than the oil formerly in use. To clinch the point, a check was kept on one nut-tapping machine, and it was found that production had been increased from 50 to 60 pieces per hour!

Have you a particularly tough, troublesome job in your shop? Shell would welcome the chance to show you how costs can be cut . . . production increased . . . with Shell Cutting Oils. These products are doing a great job in machine shops all over the country. Why not put them to work for you? There is a Shell office near you.

SHELL

SHELL *Cutting* OILS



Preventing Scratches

By changing from manual to mechanical handling of steel sheets, this manufacturer of food display equipment succeeded in eliminating practically all scratching and bending of sheets during unloading and storage

By EARL W. KENT
Works Manager
Tyler Fixture Corp., Niles, Mich.

■ SHEETS for porcelain enameling and synthetic enamel finishing must be handled without scratching or bending, if extra cost for refinishing and straightening is to be avoided. At plant No. 1 of Tyler Fixture Corp., Niles, Mich., it was found that most abrasions and bends in sheets occurred in connection with receiving and storing, during storage and when sheets were gathered for processing.

This plant is devoted exclusively to fabrication and finishing of metal parts and their assembly into all-steel refrigeration fixtures for food stores. Metal work for combination wood and steel units, which are assembled at plant No. 2, is also processed at plant No. 1. White porcelain enamel finish is used on interior surfaces exposed to foods, and porcelain or synthetic finish is employed on outside surfaces.

Because of frequent damage to sheets, management decided to handle steel sheets mchanically instead of by hand. Most of the scratches resulted from workmen walking on the sheets or from the sheets being dragged across one another as they were unloaded or stacked by hand. Mechanical handling in 1-ton lifts, instead of sheet by sheet, would prevent damage, it was thought, and would also effect definite economies.

Stock consists of Galvannealed sheets with heavy rust protection, hot rolled, pickled sheets and enameling stock. Sheets vary in gage, and range in width from 22 to 45 inches and in length from 70 to 144 inches. Stock is received by motor truck in 5-ton bundles wrapped in weatherproof paper. Each bundle is subdivided into five 1-ton packs, steel-strapped to a wooden cradle as shown in Fig. 1. To protect steel from the weather during unloading, receiving space is covered by a roof.

Use Monorail System

Instead of unloading stock onto floor trucks a few sheets at a time, an electric hoist with sheet lifting grab and a monorail system serving the entire storage floor permit handling a full 1-ton pack at each load. There are four parallel monorail lines with switches and track across one end.

As steel is received, it is unwrapped, straps are cut and 1-ton packs are lifted by the grab. This grab has drop legs which hold the carrying angle, welded to channels which slide in a main frame. On each channel is a steel rack. Between the two racks is a pinion, driven through a pair of steel bevel gears by a handwheel. A limit rod passes through a bearing welded to the main frame. Knobbed end of the limit rod is set so as to strike the bearing at a point determined by the maximum desired opening and to prevent disengagement of the rack and pinions. This grab will handle a variety of widths and lengths of material.

Although one man can operate

(*Please turn to Page* 72)

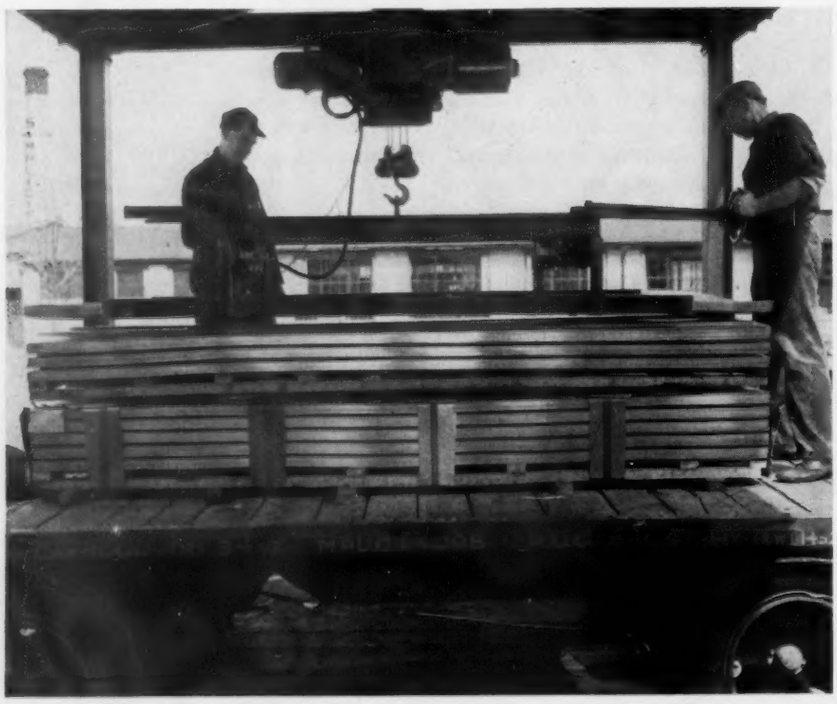


Fig. 1—Steel being unloaded by electric hoist and special grab. Tramrail extends into covered unloading dock, which protects sheets from weather. Photographs courtesy J-B Engineering Sales Co., New Haven, Conn.

Exide-Ironclads... PLUS Exide Efficiency Equipment

Exide's newest development, a 24-cell, 21-plate Exide-Ironclad Battery of the MEH type. More than 45 kilowatt hours available in a single unit! Designed to operate modern heavy duty trucks at full speed throughout an entire shift without battery change.

Exide Test Kit which, with Exide Odometer, determines size and type of battery required for any electric industrial truck on any materials-handling job.

Exide Charge Control Unit. Automatically controls charging rate and signals when battery is charged.

Exide Discharge Indicator. Signals when a freshly charged battery is needed.

. . . insure maximum production with minimum costs in material-handling

EXIDE keeps pace with—and anticipates—industry's ever-broadening needs. As greater production-demands brought better, bigger industrial trucks, capable of handling ten to fifteen-ton loads . . . Exide developed new, tremendously powerful Exide-Ironclads to operate them efficiently and economically. To the MVM and TLM Exide-Ironclads were added the oversize Types FLM and MEH, compact units of amazing power, with capacities of 700, 800, 900 and 1000 ampere-hours at the normal discharge rate.

But even good batteries require proper care. So Exide developed the Exide automatic Discharge Indicator, which gives visual warning when an Exide-Ironclad is approaching discharge. This contributes to better truck performance, and eliminates the possibility of schedule-destroying "tow-ins."

For still better service to Exide-Ironclad users, Exide developed the Exide Charge Control Unit, which *automatically* controls the charging rate of batteries, automatically cuts the circuit and signals when the charge is complete.

Exide also developed the Exide Odometer and Exide Test Kit, with which it is possible to determine what type and size of battery is needed to obtain the utmost efficiency from any electric industrial truck.

Let the Exide System solve your material-handling problems. Rugged, long-lasting Exide-Ironclads and these new auxiliary aids will enable you to move more material, move it faster, more efficiently, more economically. Write for full details.

Exide
IRONCLAD BATTERIES
With Exide **MIPOR** Separators
"MIPOR," Reg. U. S. Pat. Off.

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

Automotive

Trouble-free valve performance is dependent upon unusual care in manufacture and treatment, as shown in the accompanying illustrations of operations in a Chevrolet plant

■ ILLUSTRATIVE of high-production valve manufacture is the technique employed at Chevrolet plant No. 5, Flint, Mich., where the entire valve requirements of Chevrolet—upward of 50,000 per day at times—are supplied.

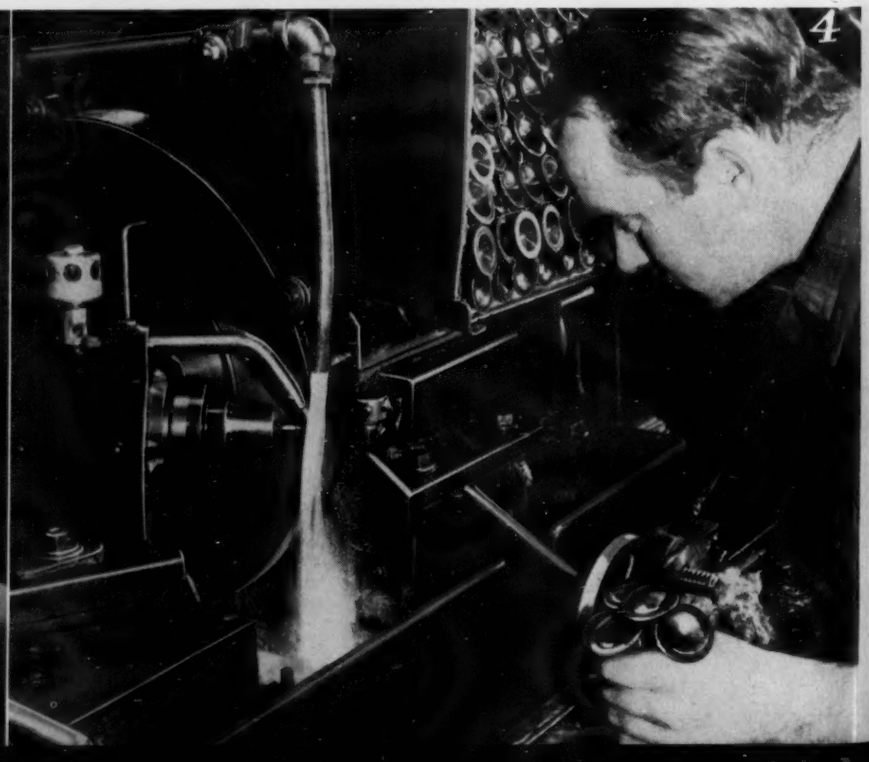
Fig. 6 tells the story. Pieces are: A slug sheared from bar, B slug after tumbling, C extruded valve, D extruded and coined valve, E roller straightened, F cut to length, G rough ground stem, H with semi-finish grind on stem, I valve seat ground, J end of stem ground, K end grooved and chamfered, L after finish grind on stem (completed valve).

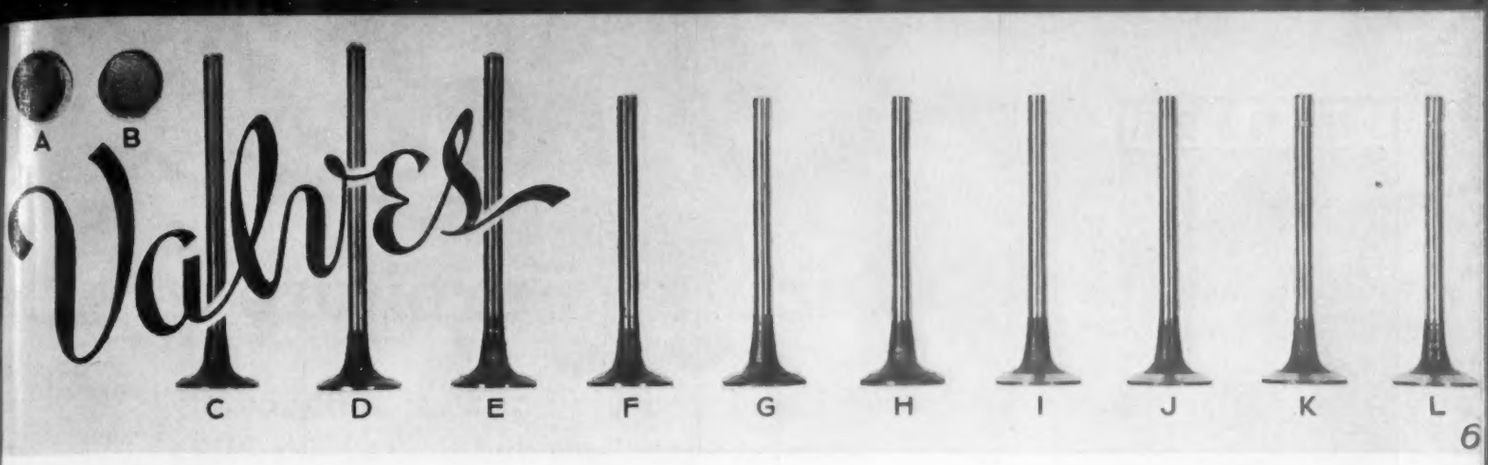
Sequence of operations is as follows: Both the inlet and exhaust valves are of a special type of silchrome steel, an analysis of the inlet valve showing a silicon content of 3.6 to 4.2 per cent with 1.85 to 2.50 per cent chromium, while the exhaust valve steel has a higher chromium content, from 8 to 10 per cent.

Stock is received in round bar form, 1¼ inches by 6 feet for intake, and 1⅛ inches by 6 feet for exhaust valves. Bars are heated to 1350 degrees Fahr., or a cherry red and sheared, four at a time, into slugs ⅞-inch long. These slugs, cleaned thoroughly by tumbling for 3 hours, pass to an oil-fired furnace which heats them to 2100 degrees Fahr. in about 4 minutes, preparatory to extrusion.

Extrudes Slug

The valve shape proper is formed in 450-ton extrusion presses, a battery of 11 being operated, each press having an individual heating furnace. Each press has two dies, one for extruding the slug, the other for coining. The first operation, Fig. 2, is to extrude the characteristic shape of the valve, the second to form the depression in the head. Op-





erators transfer the piece from one die to the other with tongs.

While still hot, the valves are transferred to straightening rollers where the head and stem are given a straightening treatment. Then a grinder removes burr from the head and the end of the steam is sheared off to approximate finished length. Valves move in tote boxes over a roller conveyor to small tumbling barrels where any slight burr on the end of the stem is removed. Exhaust valves then are routed to a furnace where they are normalized by heating to 1350 degrees Fahr. and cooling at a moderate rate.

At this point, the product is ready for machining operations which are divided into rough and finish treatments. The first step is to rough grind the stems, a battery of eight centerless grinders being available. Work then is routed to a bench, Fig. 3, where straightness of the stem and relationship of head to stem are checked and corrected if necessary. A semifinish grind on the stem is the next operation, a battery of eight centerless grinders, Fig. 1, handling this phase.

Next step is grinding of the seat face, a battery of 27 machines being available for this operation. Fig. 4 shows an automatic seat grinder. Next valves are washed with a steam spray and the seat inspected carefully, since all finish work from this point is located from the valve seat. Finishing of the stem is the next operation. First the stems are ground off to proper length in specially designed machines which hold the head down firmly and at the same time turn the stem. Turning the stem while being ground to length improves the finish on the end and insures stem squareness.

Ends of the valves then are chamfered and grooves cut, Fig. 5, in 8-station rotary machines, after which another battery of eight centerless grinders, Fig. 8, puts the finish grind on the stems. Before reaching these finish grinders, valves are transferred from the tote boxes to racks made of heavy steel frame and wire mesh which prevent scratching or nicking in further handling. Complete inspection of dimensions and finishes, Fig. 7, then follows, and the valves are ready for shipment.

Tubular Furniture

Where plating, polishing and assembly constituted important problems and limited flexibility in design, welding after these fabricating operations had been completed resulted in a product of excellent appearance that stands up well in all types of service

By **CLINTON BOLIN**
Lloyd Manufacturing Co.
Menominee, Mich.

■ A RECENT design of chromium tubular furniture includes, as the main feature, the use of three streamlined ovals of tubing fastened tightly together to form the ends of a chair and davenport.

The problem of plating tubes tight against one another had previously been avoided because it was considered impractical due to the need of polishing and plating with the tubes fastened together as one unit. It is difficult to electroplate in the crevices where the tubes come together, and it is more costly to polish because an extra thin wheel must be used to get down between the tubes.

If the pieces were polished and plated as separate units and then fastened together, rivets or self tapping screws would have to be used, which was against the designer's wishes. He demanded that the chair end must be rigid and free from any projection of a rivet or screw head above the surface of the tubing. This was logical because this chair end acted also as the arm rest, and anything projecting above the surface of the tubes would catch in clothing or scratch a person's hands or arms.

It was decided then that the three ovals would have to be polished and plated as separate units and then fastened together. Rivets and self tapping screws were tried with their heads countersunk to keep them below the tube surface. Neither method was satisfactory. When chromium plated tubes are touching each other, they must be held absolutely rigid because any slight movement produces a most annoying squeak. To overcome this, the only method of fastening seemed to be welding, but this first appeared impractical because of the possibility of spoiling the plating around the weld.

At this point it was suggested that the tubes be arc welded together in spots in the crevices on the underside of the tubes. A few pieces of plated tubing were secured and experiments begun. Soon it was found that by using 60 volts, 60 amperes and a 3/32-inch diameter rod, an excellent weld could be made, free from spatter. The plating around the weld was as good as ever.

A chair then was made up and arc welded after all parts were plated. The welding was done in spots approximately an inch long in the underside crevices where the tubes came together and the welds painted with aluminum paint to keep them from rusting. Each chair end was extremely rigid and the welds were completely hidden from ordinary view. The uphostered part of the chair, that is the seat and back, were suspended on two tubes which in turn were fastened to the chair ends. Self tapping screws were used here together with a small arc weld because of the extreme load at the fastening point. A large weld would be too noticeable. The self tapping screws were not objected to here because they were out of the way and could not catch in anything.

Construction Is Solid

The completed chair is quite solid, Fig. 1, a truly modern and streamlined a piece of furniture. Thus arc welding made possible this advanced design.

This suite, however, was made for the higher priced bracket and therefore was out of the reach of the mass market. So the same features of this design were incorporated in a medium priced design, Fig. 2, which sold for the same price formerly charged for plainer and more conventional furniture. Here, the 2-tube idea was used to get the effect. On one particular chair and

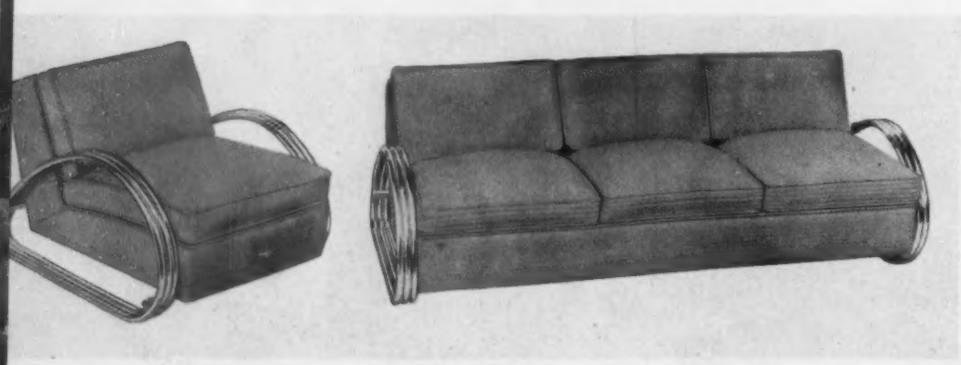


Fig. 1—Wrap around tube construction is used for chair and davenport ends here. Joints are made underneath by running a weld across adjoining tube faces

This is abstract from paper receiving third main award, $1,729.84, in Furniture and Fixtures classification of the $200,000 Award Program sponsored by James F. Lincoln Arc Welding Foundation, Cleveland.

ADVERTISING PAGES REMOVED

Fig. 2—Lower priced line using coil of single tube in pieces center and at right. Piece at left uses two tubes which lap only at sides, one tube extending forward, the other to the rear

davenport, the double tube chair end was actually one tube, made so after all the necessary bends were made and welded in a regular butt joint. This end was then like a single coil, with the double tube only on the arm rest part and a single tube on the base. This meant that the double tube portion would have to be spread apart while plating and polishing and then arc welded together.

Some experiments were made on plating tubes that were welded tightly together. It was at first thought this would give a better job because the method of springing the tubes apart while polishing and plating might pull the chair ends out of shape.

In polishing, a thin wheel was used to get down between the tubes as far as possible. This was accomplished fairly well and without too much bother or waste of time from ordinary polishing procedure. Then plating was tried and a fair job was accomplished because it plated all over except an area about a ¼-inch wide all along the center portion where the tubes touched together. While this portion plated, it was too thin and was easily cut through during buffing. While it looked all right, it was realized that within a short time the real effect of this thin plated portion might spoil the entire job because it would tend to corrode and peel.

Welded After Polishing

After this experiment, a chair was polished and plated with the tubes spread apart and then arc welded together. A perfect job resulted.

Other chairs in the line were made in separate pieces and arc welded together after they were plated. This gave the chairs and davenports a sturdy construction and smooth design. The wide acceptance of this furniture is real evidence of its outstanding value and design.

Service life of the furniture is greatly increased because of its rigid construction. There is real economy in the long life of this furniture.

This method of arc welding after plating can be used throughout the chromium furniture industry to eliminate rivets and screws in places where the weld isn't noticeable. It permits a more rigid and smoother design. It is expected to broaden the field for designers who heretofore have been limited because of plating, polishing and assembly problems.

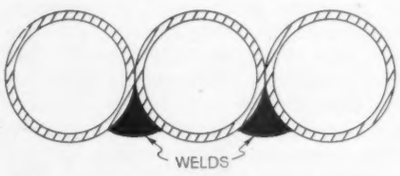


Fig. 3—Cross section through tubes used in pieces shown in Fig. 1 with welds across under side of tubes

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Inspect Blast Furnace

(*Concluded from Page* 52)

of 6000 wooden piles 75 to 80 feet long and driven down to hard pan. Five longitudinal concrete walls support transverse beams, on top of which was laid the oven pad.

The ovens are 15½ inches wide on the pusher side and 18½ inches wide on the coke side. They are 42 feet 9½ inches long by 13 feet 5½ inches high, and take an 18-ton coal charge. Either coke oven gas or blast furnace gas may be used for underfiring, and the layout is such that any group of ovens may burn one fuel while the balance use the other fuel. Provisions have also been made for diluting the coke oven fuel gas with blast furnace gas, to a calorific value of 450 B.t.u. per cubic feet. Likewise, blast furnace gas may be enriched if desired.

Reversing machines, decarbonizing machines, control of fuel gas, and all oven instruments are located in a room between the two batteries. Continuous recording calorimeters show the heating values of both blast furnace and coke oven gases.

The ovens are provided with self-sealing doors. There are two pushers, but either machine can handle both batteries in case of an emergency. Quenching cars are moved by 20-ton electric locomotives. The quenching car, coke guide, and pusher machine are electrically interlocked so that all machines must be located at the proper oven before the pusher ram can be operated.

A quenching station is located at each end of the quenching track, and is formed of a structural steel framework with corrugated transite siding. They use waste water from liquid coolers in by-product plant.

From the wharf coke is conveyed by belt to the coke screening station, which has a capacity of 175 tons per hour and is arranged to produce foundry, furnace, and domestic coke. The screening station is flexible in arrangement. All conveyors are electrically interlocked so that a stoppage of any one shuts down all units.

Industrial Lighting

■ Advances in the art of lighting have made possible a scientific approach of lighting for industrial machines used in the manufacture of small metal parts. Results of studies by the Illuminating Engineering Society, through its committee on lighting practice, dealing with this subject have been published in a pamphlet "Lighting for the Machining of Small Metal Parts." Lighting of plane and convex surfaces such as on flat rules, calipers and indicating scales of machine tools is analyzed.

The experimental results reported indicate the desirability of diffusing light sources of comparatively low brightness which subtend a large angle at the point of work. This may be either a source of small physical size close to the work or a large source subtending the same angle at a greater distance from the work.

Indirect lighting today provides most common large area diffusing source. Where it is impractical to use the ceiling as a diffusing source, smaller diffusing sources mounted relatively close to the work may be used. No specific spectral quality of light is recommended for maximum visibility. Copies of the pamphlet may be obtained from Illuminating Engineering Society, 51 Madison avenue, New York.

High-Speed Press

New system of oscillating die movement and press action eliminates dwell and sudden reversal of driving forces, producing smoother operation, longer die life, and previously unheard-of working speeds. Quality improved by speed

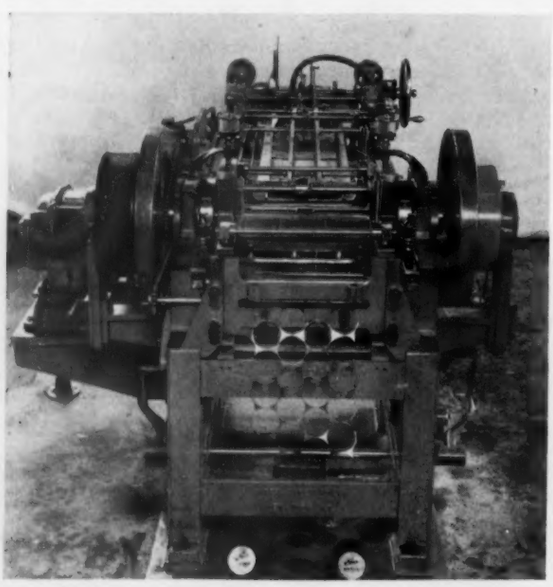
By JOHN MITCHELL
President
Super Speed Press Corp.
New York

■ THE RECENT trend toward increased use of parts build-up from punched steel laminations may be augmented greatly by adoption of a new type of high-speed punch press recently developed.

When solid parts of electrical equipment such as motor rotor cores and field cores are made of thin laminated sheets stamped out and assembled by stacking to get the required thickness, it is extremely important that the laminations be free from burrs and exactly to gage. Also the building up of solid parts from stamped laminations holds interesting possibilities in other than the electrical field as some very practical results in reducing cost of articles have been obtained by adoption of this method. Intricate shapes can be punched out accurately so that when assembled by riveting or brazing to make a solid piece, no further machining or finishing is necessary.

Designers of press equipment have contributed much toward speeding up and increasing the accuracy of the manufacture of stamped metal parts. One design of particular interest is shown in the accompanying illustration. This particular setup is used to blank out sheet metal container tops from wide coil strips. In this type of press, the die bed reciprocates in a horizontal plane, the amount of its travel being approximately 1/3 the feed per piece. The punch member takes its motion directly from a crankshaft, the amount of stroke being adjustable. The resulting rotary motion of the punch face coincides at its lower arc with the reciprocating die on its forward stroke.

In going through the press, the stock travels continuously. It is gripped by the stripper and held between the punch and die while the whole thing travels forward horizontally as the punch penetrates the sheets. As it passes the center of the stroke, the punch withdraws from the sheets and the stripper clears the punch. Stock continues to be fed forward by rollers controlled directly from the crankshaft through a variable speed drive. Since this can be adjusted while the machine is running, it is possible to synchronize the motions of the various members to leave only a minimum amount of scrap. Note in the accompanying illustration that a mere skeleton of the sheet remains after the work has been punched out.



Super-speed press blanking out sheet metal container tops from a coil of steel strip

When the stripper is in contact with the work and while piloting and forming are being done, a cam-operated feed roll lifter is provided to release the feed roll. As all motion is continuous, there is no lost time in recovery and no pause or dwell either of stock or tool. While the machine takes standard die sets and avoids the necessity for gang dies, dies from 1 to 10 up can be used in the press. The quality of work produced is said to be of a much superior character. The reason for this is given by comparing holes made in a pane of glass. Throwing a piece of metal through a glass at low speed produces a ragged hole. At high speed, a clean-cut hole is made. This accounts for the extremely good results obtained on this press.

Obviously, this press is a high-speed machine. Its top speed of 1500 strokes per minute indicates the high production possibilities of this equipment. Production speed, of course, will vary with the kind of

material, the size and thickness of blanks and character of the die.

Present conventional type of presses give an average output not over 200 blanks per minute. Super-speed presses of the type just described average from 800 to 1000 blanks per minute. This output is obtained with one operator as with the usual press, thus affording a most significant reduction in production cost with less space taken up in the plant, less power consumed and corresponding reduction in taxes, insurance, records and other overhead items.

The super-speed press will do blanking, piercing, progressive work and shallow forming on any material that can be stamped. Thus it has a wide range of applications. The range of blanking is wide. It includes from the thinnest metal to work requiring up to 30-ton pressure. The machine is particularly suitable for all sizes and designs of blanks, especially motor and electrical equipment laminations.

Quality Is High

Quality of the work is exceptionally high, due to the high speed as pointed out above. By substituting for the pounding together of two masses of metal, a system where speed and short impact are the essential features with continuous oscillating type motion of all parts, it is easy to sustain precision of adjustment. Any adjustments that are required on the blanks can be done while the press is in operation, thus avoiding delays from shut-downs.

One of the most important results of the continuous motion and smooth action obtained in this press is the greatly increased die life with corresponding decrease in expense for dies and die maintenance. For example, one user found that cost of 100,000 blanks on ordinary type of press was $247. This did not include the cost of the die but did include die regrinding and shop overhead of 150 per cent but no general overhead. The cost, using a super-speed press on this same blank, the same quantity, with the same overhead conditions, amounted to $161. The material in both these figures was the same—$139. With this item subtracted, the cost of manufacturing was $108 and $22 respectively. This involved just two hours work on the super-speed press. While cost figures will vary with the character of work, the percentage of saving will be quite similar to that in the above example.

This machine is not merely an improvement over old methods, but many regard it as an entirely new method, one much more simple and one capable of producing superior quality of work at lower cost.

Another factor reducing die cost is the fact that extremely small amount of heat is produced in the punch and die. In the super-speed press, virtually no heat can be detected.

The machine is already being employed on steel thickness varying from 0.002 inches to 0.095 inches. Three presses are in use producing radiator fins at high speed. Electric motor laminations and transformer parts are being produced on other machines with no burrs or ridges around the edges of the laminations. On one job, a super-speed press operates at 1700 strokes per minute which possibly is the highest yet obtained by these machines. However, this is believed not to be the maximum possible speed that may eventually be attained.

Work Limits Speed

Of course, on many operations the type of work involved limits the speed of the press to 1000 strokes per minute or less. Nevertheless, it has been found possible to increase greatly the number of strokes per minute thought possible on various types of work by designing the dies with a little more clearance than usual. Even when greater clearance is given, the edges are still sharply cut because of the extreme speed of operation of the machine.

In more than one instance it has been found that dies regarded as too badly worn for further use on ordinary type of presses, when installed and set up on the super-speed press were found to operate perfectly, due to the greatly increased speed.

Another cost factor which permits a further saving is that the high speed of production provides an opportunity of using one die, one up. This may be an important saving in die construction as it may eliminate entirely the original cost of making a die more than one up. Yet the increased production desired is still available due to the high speed of the press.

At the same time, dies from 1 to 10 up can be used in the super-speed press if desired, and progressive stamping and forming operations also can be handled at the same high speed as ordinary blanking operations.

Rigid Frame Tests

■ "Strength of a Riveted Steel Rigid Frame Having Straight Flanges" is the title of a pamphlet published by the national bureau of standards. The distribution of stress in a riveted steel specimen was determined theoretically and experimentally, and the maximum load measured. Photographs, tables and charts illustrate results. Pamphlet may be obtained as Research Paper RP1130 from Superintendent of Documents, Washington; price is 15 cents.

Order of Merit For Twenty-Four

■ Westinghouse Electric & Mfg. Co. has conferred its Order of Merit, a medal and citation for outstanding contributions on 24 employes, raising the total number to 85 since the order's inception in 1935.

All employes are eligible to the order, awarded by the board of directors after nomination by fellow employes. Awards are for contributions to the electrical and mechanical industries, or for improvements and developments in system, method, tools and equipment, etc.

Latest recipients include: President George H. Bucher, "The ideal Westinghouse man: modest, intelligent, industrious, alert and eminently capable."

Marvin W. Smith, manager of engineering at East Pittsburgh; Gaylord W. Penney, manager of electro-physics section, and inventor of the "Precipitron"; C. M. Loffoon, manager of alternating current generator engineering for the generator division; John B. MacNeill, manager of engineering for the switchgear division; Douglas F. Miner, manager of engineering laboratories and standards; John Selby Parsons, central station engineer; Frank B. Powers, engineering manager for the transportation division; John H. Priest, superintendent of works' industrial relations, and Lawrence D. Rigdon, director of equipment negotiations.

Dr. Emerson B. Roberts, assistant to the vice president, industrial relations; S. R. Shave, director of the budget division, accounting department; Ira B. Stiefel, manager of industrial relations, and D. I. Vinogradoff, manager of foreign engineering, all of East Pittsburgh.

John T. Burke, supervisor of industrial relations; Oscar A. Frejd, master mechanic; John K. Hodnette, transformer development engineer; and Henry J. Wilcoz, all of the Sharon, Pa., transformer plant.

W. C. Hipple, superintendent, Trenton Lamp division, Trenton, N. J.

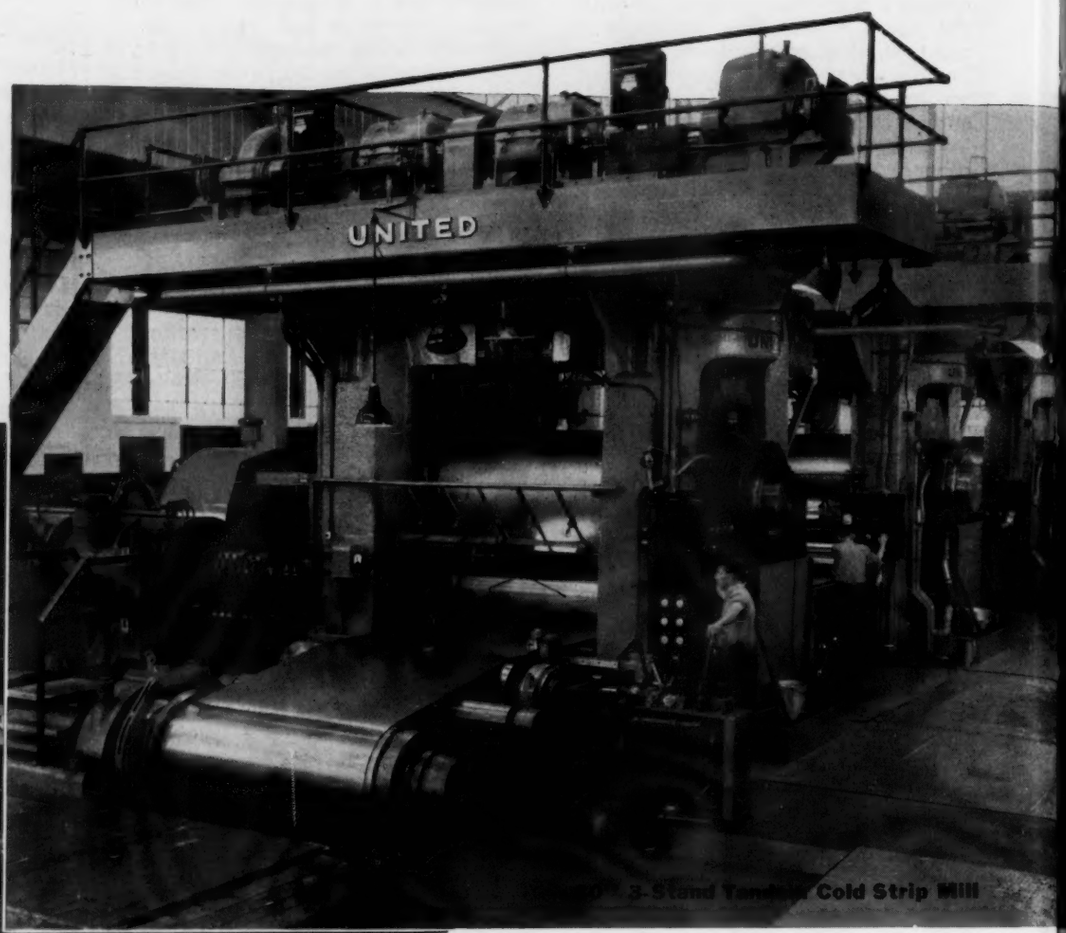
Cornelius J. O'Brien, manager, traffic department, Westinghouse Electric International Co., and Charles A. Reinwald, assistant secretary and attorney, law department, both of New York.

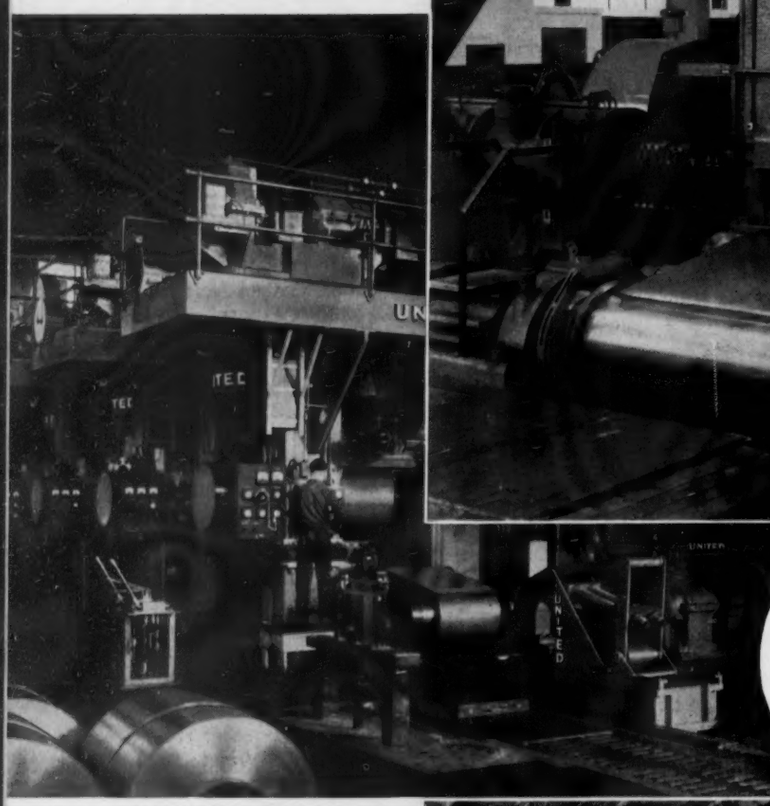
William A. Stacey, manager, western district, Bryant Electric Co., Chicago.

Paul Guercken, European vice president, Westinghouse Electric International Co., London.

Almon W. Copley, engineering manager, Pacific coast district, San Francisco.

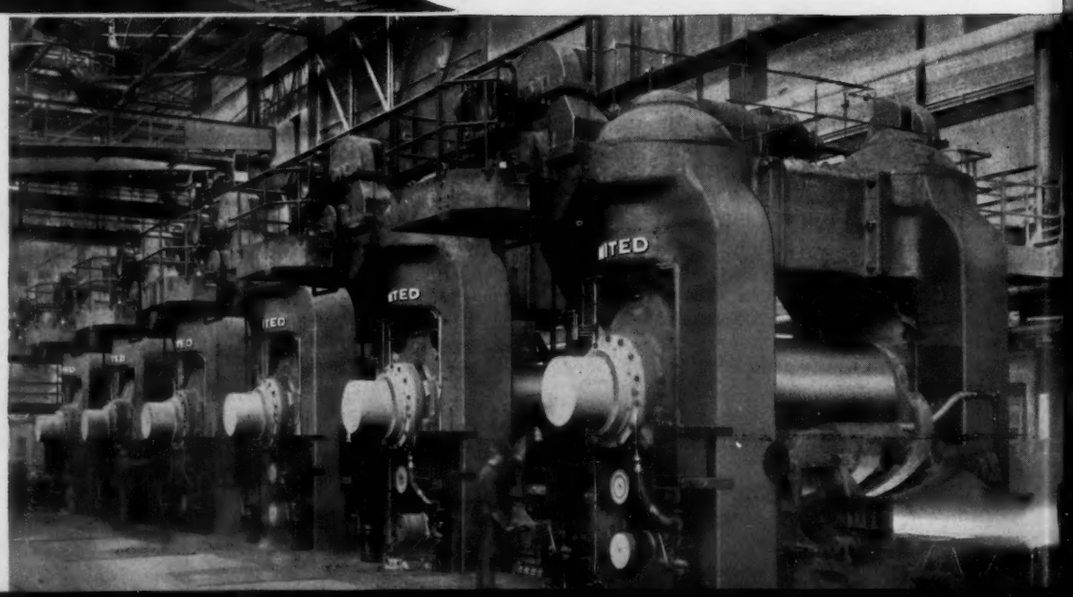
Complete rolling mill





UNITED

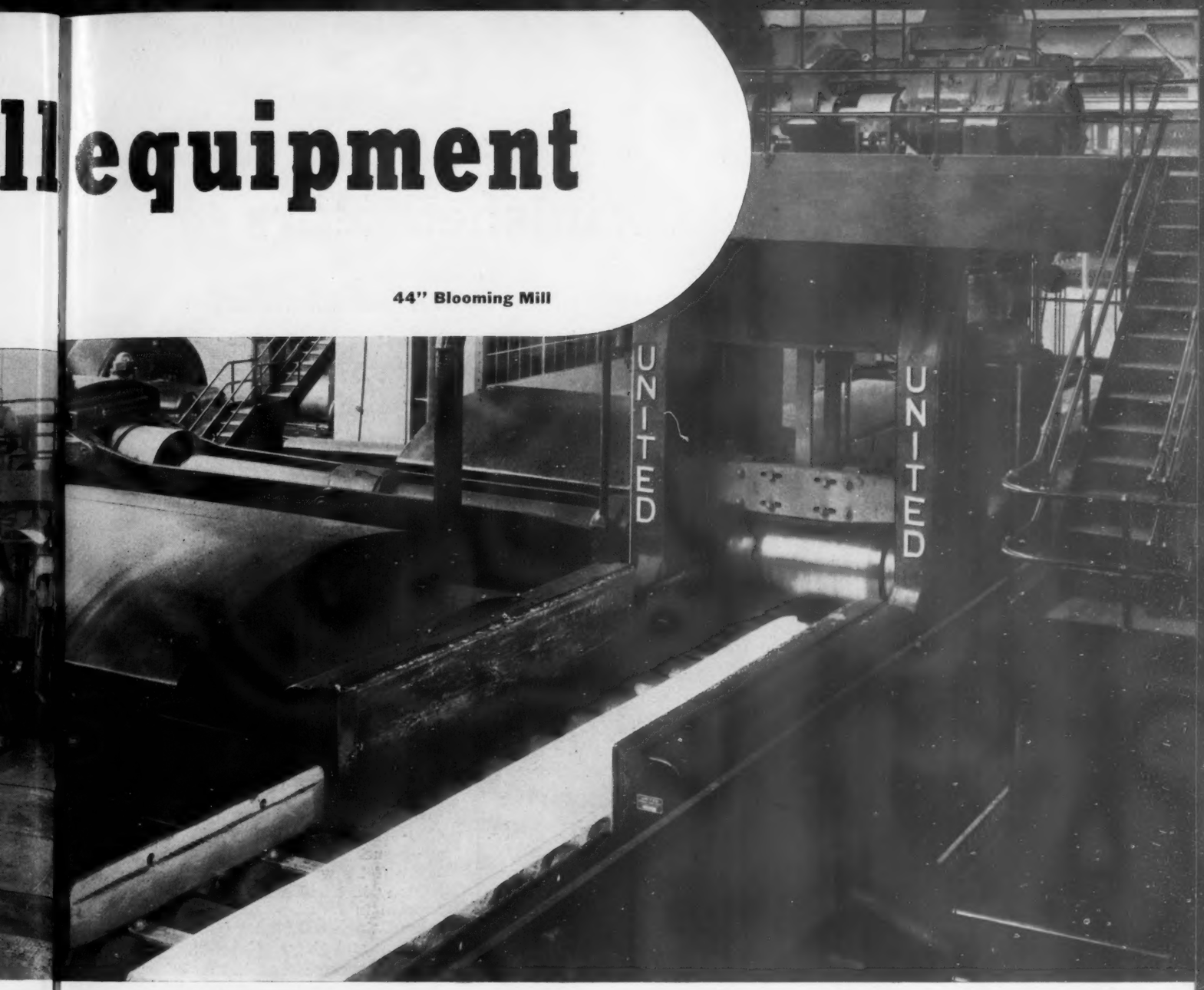
4-Stand Tandem Tin Plate Mill



98" Continuous Hot Strip Mill

ll equipment

44" Blooming Mill



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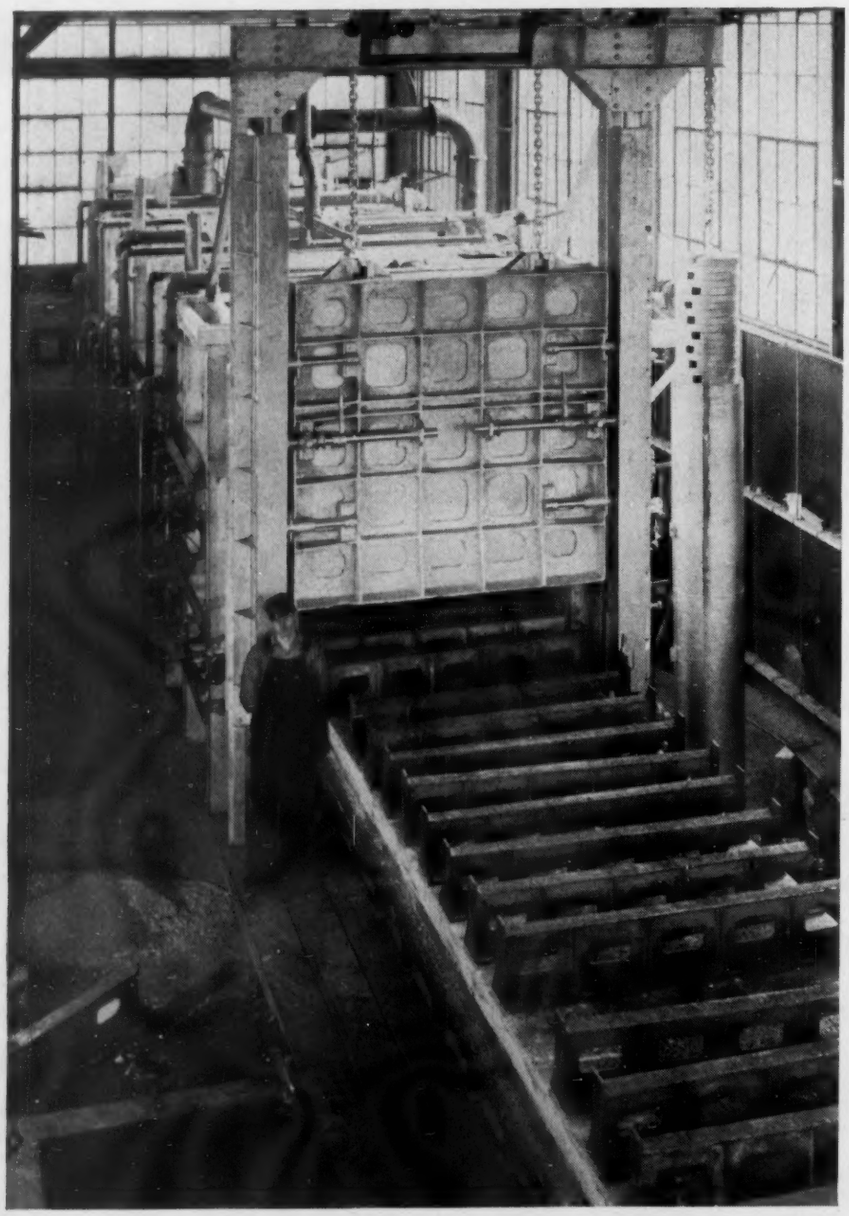
12" 7-Stand Merchant Mill

Cold Finished Bars

In order to produce heat-treated cold finished bars for automatic screw machining this company installed the furnace described here. Use of such preheated bars effects considerable economy where hardness and physical requirements are suitable



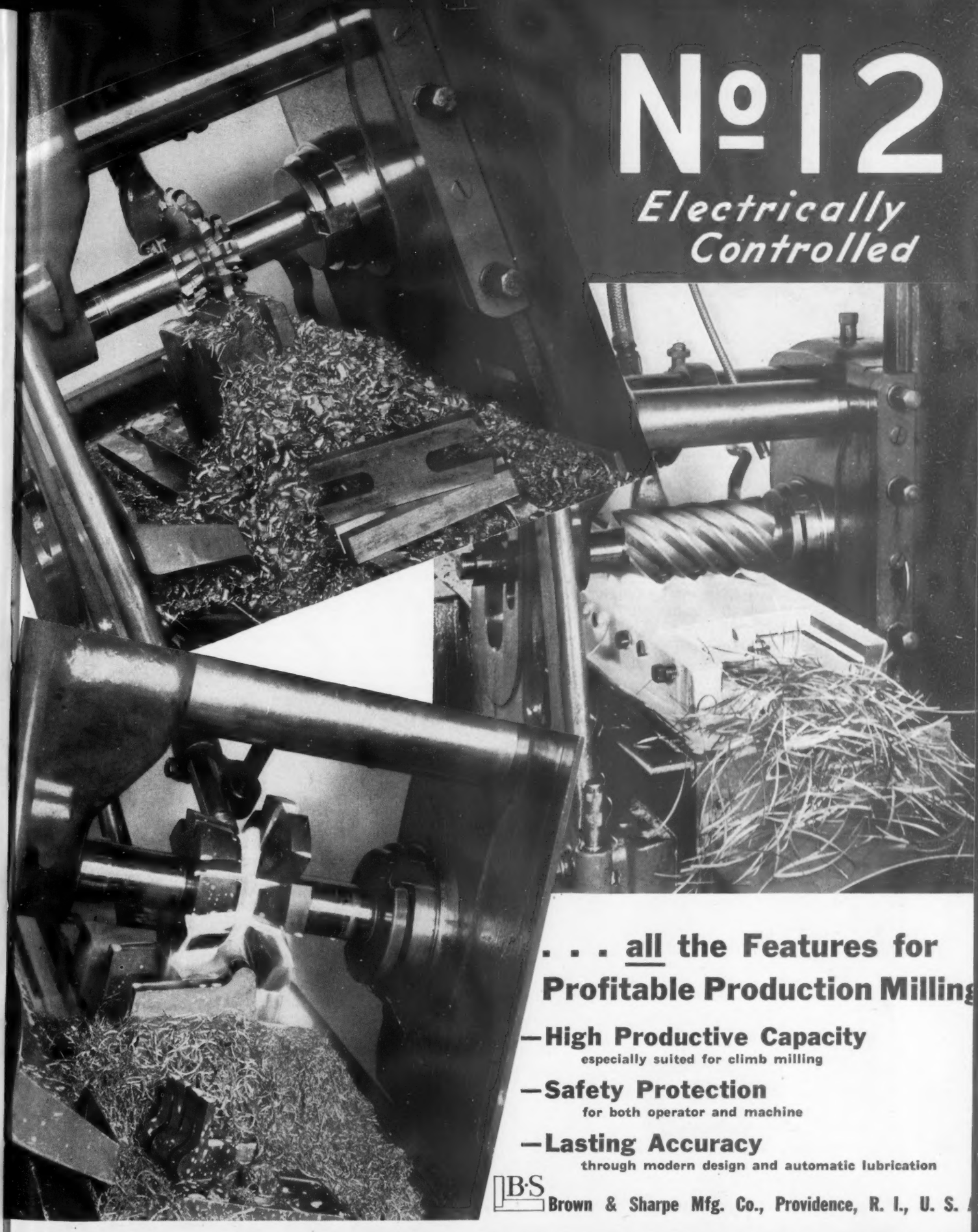
By A. G. STURROCK
Metallurgist
Wyckoff Drawn Steel Co.
Chicago

■ CONFRONTED by a growing demand for annealed and heat-treated cold finished bars, particularly in alloy steels of 0.35 to 0.55 per cent carbon range such as SAE 3140, 4140, 4150 and 3250, and also in carbon steels such as SAE 1045 and X 1335, Wyckoff Drawn Steel Co., Chicago, recently installed a car-bottom type furnace in its plant for annealing, normalizing, heating for quenching, drawing and stress relieving.

This furnace, shown in Fig. 1, has a car bottom 36 feet long and 6 feet wide and a rated annealing capacity of 40,000 pounds per charge. Distance from top of piers on the car to spring line of the arch is 40 inches (Fig. 2). Fifty low pressure mixed gas burners in the furnace sidewalls fire both over and under the work. This multiplicity of burners assures uniform heating. For low temperature operations, such as drawing and stress relieving the oven, firing burners alone can be used.

Flues are taken out of the furnace chamber at hearth level through vertical flues in the sidewalls. Vertical flues terminate in horizontal collector flues. Located in the horizontal collector flues are three alloy dampers, operated by means of a motor mechanism which,

Fig. 1—View of furnace showing car equipped with alloy stools. This equipment was designed, fabricated and installed by Surface Combustion Corp., Toledo, O.



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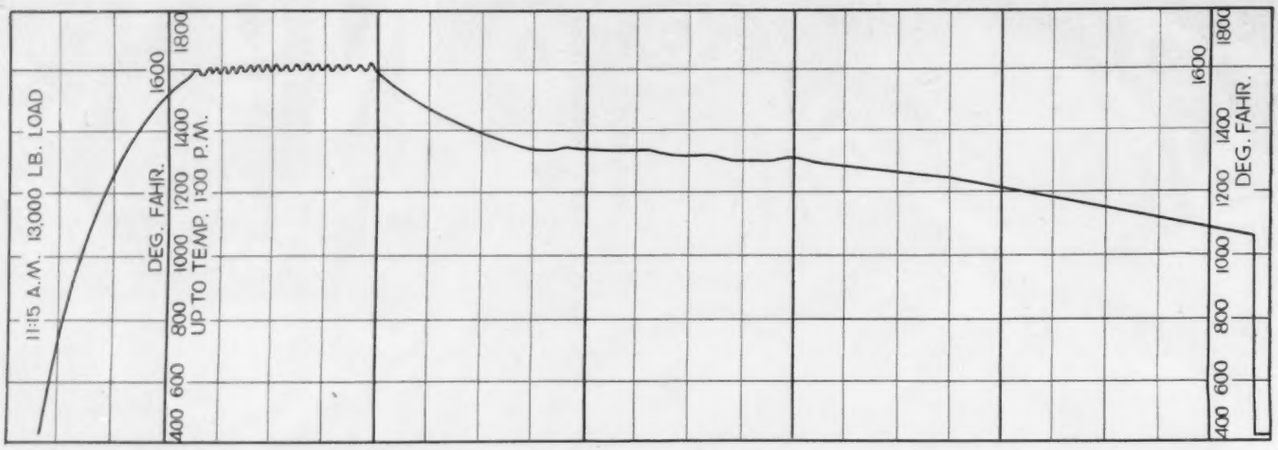


Fig. 3—Time-temperature chart showing heating and cooling curves

in turn, operates in conjunction with the heat control. When burners are operating, the dampers remain open. When heat control shuts off the burners, motor mechanism automatically closes the dampers, thus keeping a pressure in the furnace and preventing air filtration.

Furnace sidewalls are lined with 9 inches of insulating fire brick backed up with 4½ inches of plain fire brick. The arch, back wall and door also are lined with 9 inches of insulating fire brick. With a 40,000 load, the furnace and load can be heated to 1600 degrees Fahr., from cold in 3 to 3½ hours.

It has been found that for most machining operations on annealed and cold drawn alloy steel bars, a structure consisting of lamellar pearlite with ferrite well distributed produces the best results. To produce this optimum structure, a definite rate of cooling through the critical range is required for each particular type of steel. This is where insulated furnace walls are an aid. Owing to low heat storage, furnace starts to cool when the gas is shut off, and as the cooling rate is very fast, a controlled cooling rate is maintained easily by manual operation of several burners. Fig. 3 shows a time-temperature chart for annealing a 13,000-pound load. Time for heating to temperature was 1 hour and 45 minutes. In this instance, cooling rate through the critical range was about 35 degrees per hour.

Fig. 2—Interior view of furnace. Note burners in sidewalls. Burners fire both below and above the work

Demand for heat-treated, cold finished bars necessitated the construction of mechanism for pulling heated bars from the furnace and quenching them in oil or water. This individual quenching makes for uniformity. After bars are quenched, they are placed in the furnace again and are drawn at the proper temperature to produce the desired properties. These quenched and tempered bars then can be cold drawn or straightened for turning or grinding.

The usual limit of hardness on such pre-heated bars is about 300 brinell, although it is possible to furnish bars to higher hardness. Where hardness or other physical requirements are such that a pre-treated bar can be used, there is often a considerable saving in its use.

The heat-treated bar cannot be machined as readily as an annealed bar, but against this increased machining cost is balanced the elimination of further operations such as heat treating the part after machining, the cleaning usually required after heat treatment and correction of changes in dimensions caused by distortion in heat treatment.

Addition of lead to steel improves its machinability in the heat-treated condition, making possible the increased use of pre-heat-treated bars. Where close tolerances are required on heat-treated parts, the prehardened bars are valuable if hardness requirements are not beyond the machinable range. Improvements in tools and machines, together with improvements in machining qualities of steel, will extend this machining range.

Surface Hardening Processes Are Reviewed by Ohio A.S.M. Chapters

■ CONDUCTING their annual tri-chapter meeting at the Alms hotel, Cincinnati, April 20, the Cincinnati, Columbus and Dayton chapters of the American Society for Metals centered this year's technical program around "Unusual Surface Hardening" processes. Three papers devoted attention to flame hardening, hard facing and silicon impregnation, respectively.

Dealing with flame hardening, Stephen Smith, Air Reduction Sales Co., New York, emphasized advantages of this process as: Ability to surface harden work in the finished condition; minimize distortion; ease in duplicating results; applicability to work too large to handle in a furnace, to work involving only a few pieces, or to volume production as well; and economy because the equipment is simple. Castings and other products can be locally surface hardened after usual heat treatment to obtain desired physical properties.

Any steels that can be hardened by ordinary methods can be flame hardened, the speaker explained, although steels having a 0.40-0.60 per cent carbon content are best suited to the process. Fine-grained steels harden particularly well, coarse-grained must be heated with care to avoid burning. Possibilities with cast iron and malleable iron are good, although alloying elements exert complicating influences.

Carburizing by Flame

Flame carburizing and hardening is the newest development, Mr. Smith commented. In this work, a flame of carburizing type is employed. Two flames are used, the first preheating the work to carburizing temperature and the second performing the carburizing. The treatment is followed by a quench.

Questions arising from the speaker's presentation dealt largely with applications and technique. Explaining the hardening of teeth on herringbone gears, Mr. Smith stated that the torch does not make turns, but makes two passes for each tooth, each from the outside in to the center. Although this procedure produces an area in the tooth juncture which is somewhat less hard than the remaining portions of the two halves of the tooth, this has not proved detrimental.

Large areas are hardened by making successive passes with the torch until the entire surface is treated. Torch indexing is adjusted to give a minimum of overlap, otherwise a hardened area will be rehardened. This is not desirable because of the danger of surface checking. Alloy steels, particularly the air hardening type, can be hardened without quenching after application of the flame. In cases where checking is a factor, an air blast is used, Mr. Smith said.

"Hard Facing Alloys and Their Application" were discussed by R. L. Lerch, Haynes Stellite Co., Kokomo, Ind. Corrosion, erosion and abrasion are the chief enemies of metals, he asserted, and hard facing is particularly suitable for combatting abrasion and corrosion, or a combination of the two. Unfortunately, no satisfactory means has been devised to determine whether a material will or will not stand up in service—only experience with the materials in actual application will provide the answer.

Hard Facings Classified

Classification of materials offering resistance to abrasion was made as follows:

1. High carbon steel with alloying elements, also cast iron. For uses which are not severe.
2. Higher iron base alloy group with up to 20 per cent alloy. Will withstand more severe abrasion.
3. Iron base material with 20-50 per cent alloys.
4. Nonferrous materials, principally cobalt, chromium and tungsten.
5. Tungsten carbide (cast). This is placed in a hollow tube and applied to surfaces by welding.

Ferrous hard facing alloys can be applied either by electric or oxy-acetylene welding processes, nonferrous alloys are best applied by oxy-acetylene, Mr. Lerch stated. Advantage of hard facing is that it permits use of an inexpensive base material with only the wearing areas of hard relatively expensive material. Preheating to obtain even expansion of the surface is desirable before applying hard facing. Heat treating afterward usually is not necessary, slow cooling equalizing strains. In special cases—those requiring impact resistance in the surfaced part— special heat treating is performed.

Some parts, the speaker continued, need to be finished. This is sometimes done by machining, but more often by grinding. As wear in the faced surface occurs, hard facing can be reapplied, but usually this is simple and needs be done only at certain spots or areas. Base material to be hard faced should not be too soft, else it will not support the facing. Best carbon content of base material is 0.40-0.50 per cent, above that, parts may be brittle and break, although proper heat treating may remedy this.

Manganese steel is difficult to hard face, Mr. Lerch explained. Best results are obtained by using the electric arc and applying as little heat as possible. High speed steel also is a tricky base material and is naturally high in cost, unless the application demands its use. It has a tendency to crack when hard faced.

Silicon impregnation as a means of treating ferrous metal surfaces to obtain corrosion resistance and some degree of wear resistance was explained by Dr. Harry K. Ihrig, director of laboratories, Globe Steel Tubes Co., Milwaukee. As a preface, the speaker explained that corrosion is a chemical disintegration of a surface while wear is the pulling out of particles from the surface. Since corrosion is of chemical nature, we depend upon film formations on metal to prevent corrosion. Even stainless steel is protected by a film, Dr. Ihrig pointing out that this metal will corrode when this film is removed.

One of the best films would be an oxide which is inert, he continued, and such a film is silicon oxide, SiO_2. In proof of this, he stated that high silicon irons are highly corrosion resistant. Through extensive investigational work, Dr. Ihrig conceived the idea to put a film of this type on iron and steel, and in consequence developed a process which is known as Ihrigizing.

Silicon Impregnates Surface

In the presence of chlorine, silicon carbide (SiC), an inexpensive granular material produced in the electric furnace, will release its silicon at a temperature of 1800 degrees Fahr. and this silicon will impregnate ferrous material with which it comes in contact. The process is carried out in a rotary retort furnace turning at 1 revolution per minute, the silicon carbide being placed in the bottom of the retort. Work is placed in the chamber and brought up to 1800 degrees. When this temperature is attained, a stream of chlorine is introduced into the furnace. A case ranging from 0.025 to 0.040-inch is obtained in from 2 to 3 hours. Cooling is in air. The case contains approximately 14 per cent silicon and will not scale at temperatures up to 1800 degrees Fahr. Cases can be produced ranging in thickness from 0.010 to 0.100-inch.

Wear always is aggravated un-

(*Please turn to Page* 78)

Fig. 2—As sheets are stacked in storage, one operator controls hoisting movements while another guides the grab by means of the handwheel located at one end

(*Concluded from Page* 54)

the hoist and grab, two men are assigned to the job to speed up the operation. Two men can guide the grab more easily over the pile and fit the carrying angles to three openings between the 1-ton packs. A free-swinging grab might easily hit and bend edges of the sheets. Such damaged edges caused most of the scratches which occurred in rehandling at the press.

The 2-ton electric hoist is floor operated with power lift and travel. Packs of sheets are transported to storage space and are piled up to 5 feet high with 1-inch wood separators between packs for ease in rehandling when issued to production. Before new stock is deposited, all sheets remaining in the pile are set aside, then placed on top the new pile, thus assuring that old stock always is used first. This practice prevents loss from rusting. Continuous inventory is kept at the factory office for ready reference.

When steel is stored, piles are set up in pairs with approximately 6 inches between each pair to permit access by the grab, Fig. 2. Packs are set with the long dimension crosswise the track, which permits serving more piles and a greater floor area from each monorail. Thus all stacks are accessible without climbing or walking over the sheets.

All sheets involved in regular production are handled mechanically in 1-ton packs and are placed in open floor storage. Mechanical handling has eliminated practically all scratches, bends and turned edges, with a corresponding saving in finishing time and expense. Sheets used infrequently and special stock are kept in small quantities and are stored in racks by hand. As comparatively little of such manual handling is required, men can observe more care in their work and avoid damage to these special sheets.

One monorail line extends back into the press shop so that presses using large quantities of steel are supplied directly from this line by the hoist. Smaller quantities issued, or stock for presses not served by the monorail, are placed on a four-wheeled truck by the lifter, or in small quantities by hand, for transfer to presses. Extreme care is observed at presses to prevent scratches in processing.

One of the more popular models of food display cabinets made at this plant is manufactured in lengths of 4, 6, 8, 10 or 12 feet. This means that some parts are quite long. Press work is in quantity production, and many parts are assembled by welding.

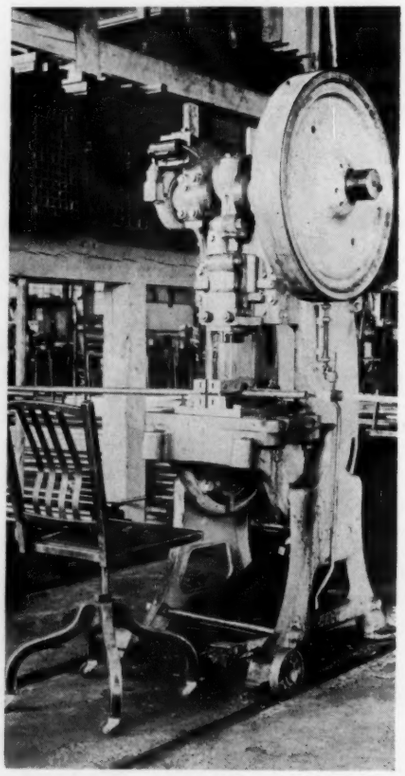
Shear Fed from Storage Racks

■ EXTRA handling of long, light, tubular stock for bedsteads is eliminated at the plant of Harter Corp., Sturgis, Mich., by an arrangement in which stock is fed directly from storage rack to the cutoff press.

As stock is received at the plant, it is stored flat in partitioned racks located just inside the receiving door. Cross sections and gages in heavy demand are stored at floor level. Stock is fed directly from the rack into an inclinable punch press which is mounted on wheels and is movable on a track extending across front of the rack. Press is easily lined up with the stock in this manner. Cutoff shear die is equipped with a special clamping device which holds tubing and prevents crushing when shearing takes place. Lengths as sheared are piled in a truck for transportation to temporary storage or directly to production or processing line.

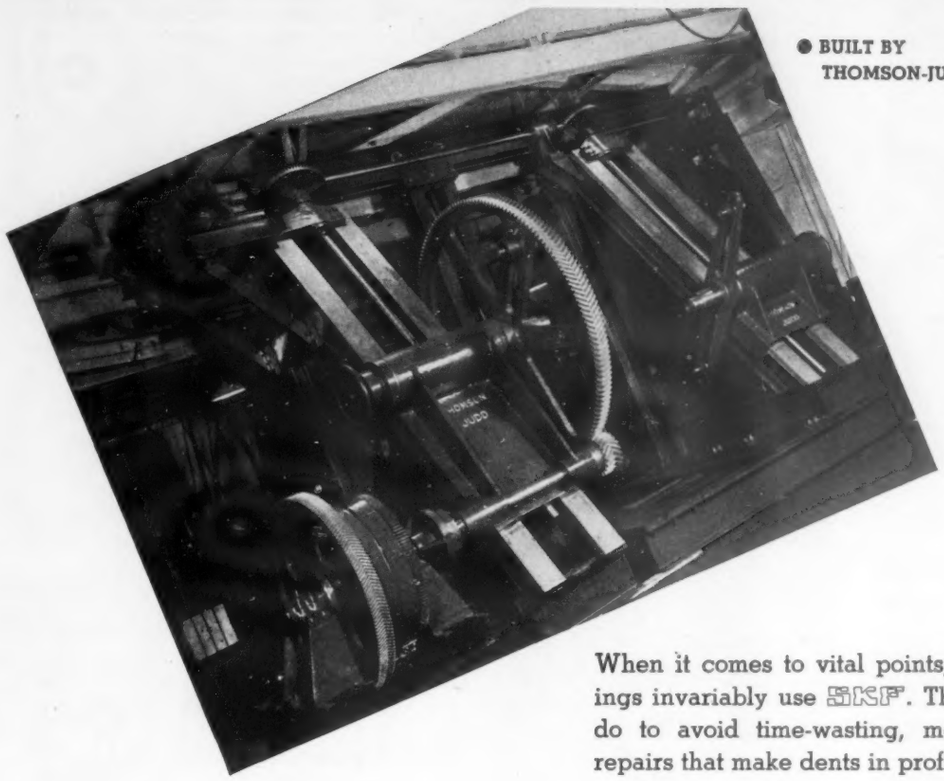
When stock in the rack drops to a level below the cutoff tool on the press bed, tubes are placed on arms extending out from uprights between the racks. This permits a straight feed to the press. An automatic indicator counts lengths as they are cut off.

In addition to eliminating some rehandling of long stock, thus lowering possibility of bending or damage, this arrangement saves floor space. If tubes were removed from rack to a separate stationary cutoff press, considerable additional floor space would be required for temporary storage of tubes at the press. A similar plan may be used to handle strip, bar and structural shapes.



This cutoff press is arranged to be fed directly from racks where tubing is stored. Note wheels and track which facilitate lining up press with the stock

REAL PERFORMANCE



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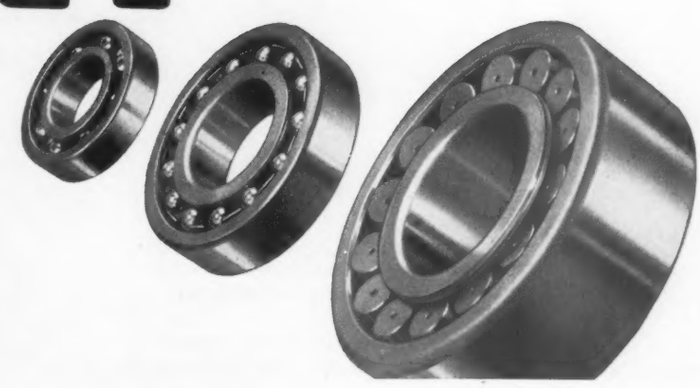
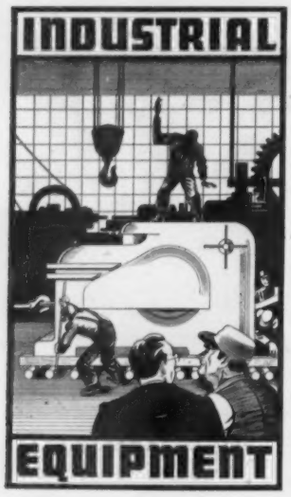


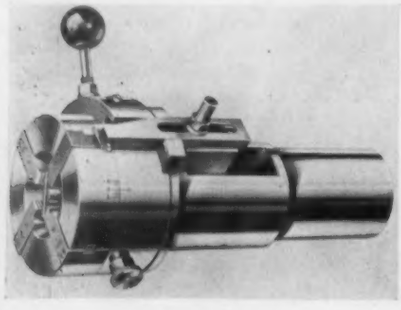


■ Hisey-Wolf Machine Co., Cincinnati, has placed on the market wet drill grinders in six different types which grind straight or taper shank drills with 2, 3 or 4 flutes; flat or chucking drills or flat twisted drills and drills with oversize shanks. Point angle can

be varied from 37 to 70 degrees on holder for large drills. Small drill holder, with snap clamp for straight or taper shanks from No. 60 to ⅜-inch, will grind drills to the standard 59 degree angle at point and 12 degree clearance angle without adjustment. Both holders have V-guides and screw feed.

Taper-Cutting Die Head

■ The Geometric Tool Co., New Haven, Conn., offers a complete line of taper cutting die heads for use



on stationary head hand-operated machines. Taper is controlled by a positive cam. Greater lengths of taper can be cut without projection chasers and length of taper is not limited to height of chaser. There are no lines when the tool opens, and thread is even all the way. Made of alloy steels, tools may be used either as inside or outside trip die-heads.

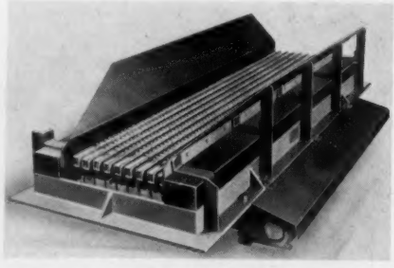
Vernier Time Setting

■ Automatic Temperature Control Co., Philadelphia, announce series 2800, type 2803, Vernier-set timers

capable of setting a time cycle to within a split scale division. Adjustment is maintained without a locking device. Independently wired loads, high voltage operation, and contact modifications are available. All types are equipped with Telechron motor. List price timer without case, $35. Cases, $4 and $5.

Alternate Bar Shake-Out

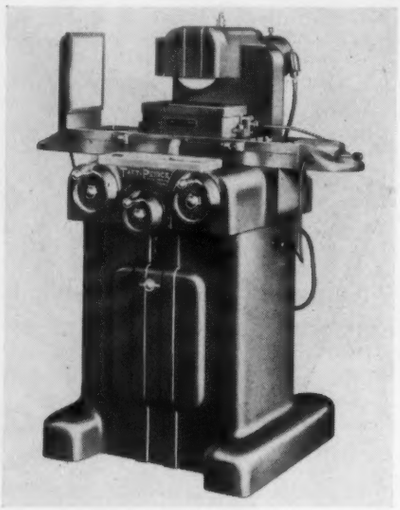
■ Royer Foundry & Machine Co., Kingston, Pa., is marketing a shakeout with a balanced twin cam action operating alternate sets of bars to form a grizzly upon which molds or flasks are placed; shakeout is accomplished by even alternate impulses of rising and falling bars.



Bars can be made to accommodate molds of any size and are particularly adaptable to small molds of intricate castings. Unit can be mounted over a conveyor belt, sand hopper or other type receptacle.

Surface Grinder

■ Taft-Peirce Mfg. Co., Woonsocket, R. I., has a ball-bearing precision surface grinder with ball



tracks to control table, saddle and spindle column travel. Wheel makes uniform parallel and rectilinear motions and may be positioned to grind with angular surface of wheel instead of side.

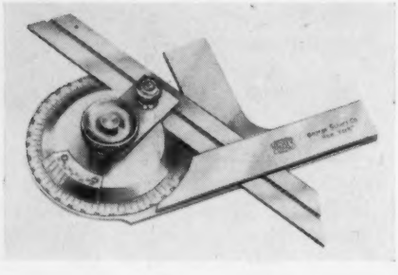
Squaring Belt-Cutter

■ Armstrong-Bray & Co., 304 North Loomis street, Chicago, announces a belt cutter which handles leather, fabric and rubber power transmis-

sion belts up to 8-inch widths. Belt is held against side guide while special knife is drawn down track making accurate square cut. Track also helps prevent knife from slipping. Unit is compact, light and may be fastened down or carried about. Listed at $4.75.

Universal Protractor

■ George Scherr Co., 128 Lafayette street, New York, announces a uni-



versal bevel protractor of Mauser manufacture with 6, 8 or 12-inch blades beveled at each end to 45 degrees and 60 degrees respectively. Dial is graduated in degrees for the full circle. Vernier gives readings within 5 minutes. Graduations are etched with jet-black markings.

Rocker Safety Switch

■ Bull Dog Electric Products Co., 7610 Jos. Campau avenue, Detroit, has introduced a new 30-ampere front-operated enclosed rocker type safety switch which has molded handle rocked by thumb action to "on" or "off" position. Handle and switch mechanism are all one piece, operating on frictionless knife-edge bearings. Provision is made on handle for marking circuit legend. Switch is streamlined and has positive action full-floating contacts, screw type wiring terminals, ten well-placed knockouts and silvered current-carrying parts.

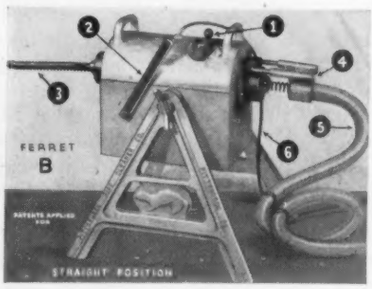
Heavy Steel Bench

■ Pollard Bros. Mfg. Co., 5510 North-

west highway, Chicago, offer an extra-heavy steel bench. Top of bench is made of ⅜-inch steel plate, 24 and 30 inches wide and 3, 4, 5 and 6 feet long.

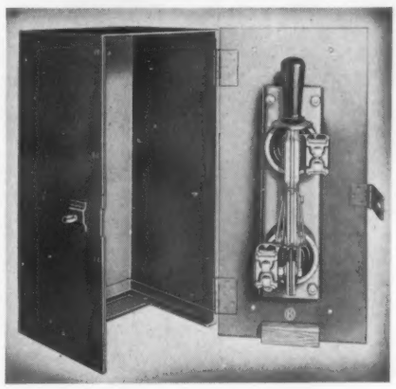
Motorized Ferret

■ Pittsburgh Pipe Cleaner Co., 229 Oliver building, Pittsburgh, has two motor-driven ferrets for opening and cleaning clogged pipes of all kinds. They work through traps, elbows, tees and U-turns and are operated by fitting a 15-foot length of helically coiled cable into a pipe-depressing clutch to spin cable, releasing clutch and feeding again. Additional cable added as required. Ferret A cleans ⅜ to 2-inch, and Ferret B, ¾ to 6-inch pipe. Illustration of model B shows; 1-electric switch; 2-clutch handle; 3-cable outlet to pipe; 4-slip joint; 5-cable guard; 6-electric connection wire.



Hanger Mounted Switch

■ Ohio Brass Co., Mansfield, O., announces a quick-break switch for circuits of 110 to 750 volts. The switch is mounted on mine hangers which in turn are mounted on a rustproof hot-dip galvanized steel base. Blades and jaws are of hard, cold-rolled copper. Switch is avail-



able in a locking steel case. Dirigo molded insulation is used in switch with soft rubber on handle.

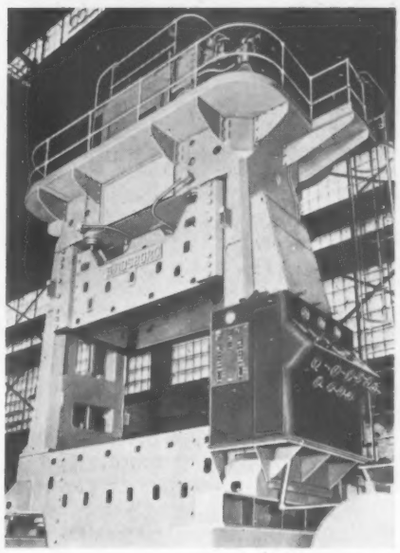
Small-Movement Switch

■ Micro Switch Corp., Freeport, Ill., has developed a roller leaf spring switch of ½-horsepower capacity to control motors, heaters, solenoids, etc., from cams, slides or rolls with small moving power. It is of single pole construction and is available in normally open, normally closed or double-throw contact arrangements. Spring is stainless steel ribbed. Roller is 3/16-inch wide and ⅜-inch

in diameter, case hardened and mounted on an oilless bronze bearing. Switch is listed by Underwriters.

Double-Action Hydraulic Press Fully Automatic

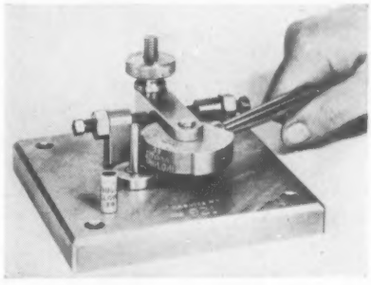
■ Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., announces a double action 735-ton hydraulic press with die cushion. Press is fully automatic and may be operated on any of four sequences. These sequences can be preset to strip work off punch or out of die. Draws of any depth up to 24 inches can be made. All adjustments of working strokes, sequences and speeds can be made by a single operator working at floor level. Press



operates at all practical drawing speeds.

Hand Marking-Machine

■ H. O. Bates, Elizabeth, N. J. has developed a hand marking machine for flat and cylindrical surfaces. Machine will roll a mark (up to 1¼ inches long by ½-inch top to bottom) into plastic as well as metals. Marking is accomplished by



a simple swing of lever after dropping part on arbor. When bolted to bench, thirty or more pieces per minute can be marked.

Reams While Threading

■ Landis Machine Co., Waynesboro, Pa., announces a reaming and cham-

fering fixture for use in its 4, 6 and 8-inch stationary pipe die heads. Fixture will ream and chamfer during the threading operation, on all diameters of pipe within capacity of head. Uniform chamfering and reaming is permitted by use of fixture.

Milling Machine Has Automatic Work Cycle

■ Cincinnati Milling Machine Co., Cincinnati, announces its 2-18 and 2-24 plain automatic milling machines of the fixed-bed type with 18 or 24-inch bed travel. Machines have 20 spindle speeds, from 30 to 1200 revolutions per minute and 16 feeds from 1 to 40 inches per minute. To further aid high production milling, an automatic spindle stop, a hydraulic backlash eliminator, and dog-controlled automatic working

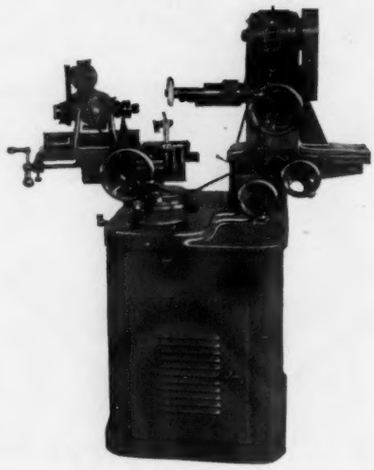
cycles with intermittent feed are provided. Dogs trip table at reversal within 0.005-inch. All automatic in operation, machines reduce hand labor to loading, starting and unloading. Lubrication also is automatic. Coolant pump and piping also available.

Welds Examined By Binocular Magnifier

■ E. Leitz Inc., 730 Fifth avenue, New York, has developed a new binocular prism magnifier for examining welds to determine penetration and porosity, and to find cracks, which are invisible to the naked eye. Visual properties of both eyes are utilized but eyes are not strained or fatigued. Images produced are realistic and objects observed stand out in natural relief.

Small-Tool Grinder

■ Chittenden Corp., 5005 Euclid avenue, Cleveland, introduces a small-tool grinder with work head spindle speed of 200 revolutions per minute. Main slide travel is 5½ inches, 10 inches with auxiliary slide. Vertical angular range of work head is 45 degrees above or below center and main or work-head slide rotates



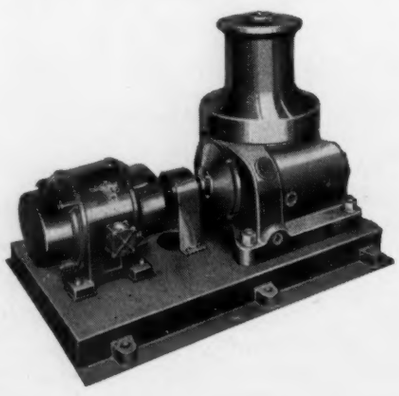
220 degrees in horizontal plane. Transverse slide movement is 6 inches, longitudinal slide movement 7 inches and graduations on vertical hand wheel are for 0.0005-inch.

Streamlined Press

■ Lake Erie Engineering Corp., Buffalo, announces a complete series of hydraulic presses. Frames are streamlined from base to top, and foundation bolts are enclosed within the bed with no projecting flanges. Centralized pushbutton control is mounted flush on the frame for inching, semi and full-automatic operation. Moving platen is guided by adjustable gibs with angular surfaces and is arranged for knockout. Standard equipment includes oil strainers, water cooled oil reservoir for maintaining correct viscosity.

Capstan Car Spotter

■ Link-Belt Co., 307 North Michigan avenue, Chicago, has introduced



two vertical capstan electric car spotters capable of 5000 to 10,000 pounds rope pull. High-torque electric motors drive mechanism through flexible roller chain coupling. Gearing is completely enclosed. Ratchet and pawl mounted inside capstan are available for holding cars on incline when power is off. No. 5-A can move one to three cars; No. 10-A, three to six cars, depending on track conditions.

Shear and Flanger

■ Quickwork Co., 400 West Madison street, Chicago, has developed Quickwork combination ball-bearing throatless shear and flanger for a wide range of sheet metal fabrication. As a shear, it handles all straight and irregular cutting, including concave and convex full circles and curves of any width or length. Smooth, even action of self-feeding rotary cutters makes it easy to follow the most intricate layouts.

Change of head converts it to flanger and shoulders of rolls guide flange. Attachments are available for U-shaping, wiring, special flanging and forming.

Quick-Change Collet

■ New Britain-Gridley Machine division, New Britain Machine Co., New Britain, Conn., announces a new spring steel precision master collet with quickly changed pads. A spring tension in collet prevents "setting." Collet is ground inside and outside. Pads also are ground inside and outside and locate against undercut shoulder. Two screws at front end slide pad firmly into its seat. Pads may be removed without disturbing adjustment. A round felt plug is placed in each split of collet to prevent coolant oil and chips from washing back to collet seat.

Open-Hearth Bottoms

(*Concluded from Page* 44)

point fluxes such as open hearth slag. However, all samples taken showed the magnesite to be well burned, and undoubtedly of greater refractoriness than bottoms heretofore.

Chemical analysis of the finished bottom is shown in Table II.

Savings in material and labor for the installation of this bottom compared with recent installations of the conventional type was 7.04 per cent. Savings in material, labor and furnace time, (at $60.00 per hour), was 48.4 per cent.

Data on the run just completed is given in Table III.

During the month of January, 1939, this furnace made 78 heats, with an average of 135.10 gross tons per heat. Average elapsed time, tap to tap, was 9 hours and 36 minutes, or 14.08 gross tons per hour. This is 22.89 gross tons per 1000 square feet of hearth area and 4,077,900 B.t.u. per gross ton of steel. During the week of Jan. 29, 1939, this furnace made 19 heats, averaging 8 hours and 45 minutes from tap to tap and 15.43 gross tons per hour, tap to tap.

This furnace is now in the course of rebuilding. Banks and bottom were found in excellent shape.

Flat-Belt Ratings

(*Concluded from Page* 49)

pheric condition 1.0, angle of center line 1.0, pulley material 1.2, service 0.8, peak load 0.6.

Calculation: 10/[6.7 x 0.65 x 1.0 x 1.0 x 1.2 x 0.8 x 0.6] = 3.99 inches. Therefore, use 4-inch light double belt.

Example No. 2

Problem: Determine capacity of 8-inch, heavy, double belt on following drive: Lineshaft, 200 revolutions per minute, cast iron pulley, 48-inch diameter x 12-inch face; fan, 600 revolutions per minute, cast iron pulley, 16-inch diameter x 12-inch face, requiring 35 horsepower at this speed; conditions, tight side above, 16-foot centers, drive nearly vertical, 8-hour per day operation exhausting from woodworking shop, dusty conditions.

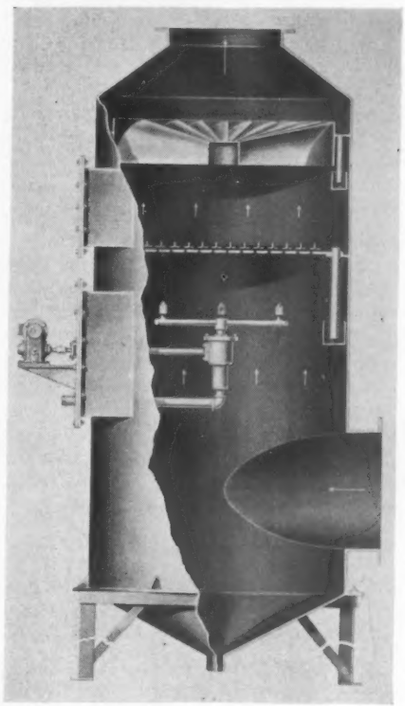
Selection of factors: Belt speed 48 x 3.14 x 200/12 = 2500 feet per minute; from Table I, heavy double belt is suited for 16-inch diameter pulley; from Table I, heavy double belt will transmit 8.55 horsepower per inch of width at 2500 feet per minute; from Table II, factor for center distance and small pulley diameter is 0.80; from Table III, atmospheric condition 0.7, angle of center line 0.8, pulley material 1.0, service 1.0, peak load 1.0.

Calculation: 8 x 8.55 x 0.80 x 0.7 x 0.8 x 1.0 x 1.0 x 1.0 = 30.6 horsepower. Therefore, belt not suited for 35-horsepower load. However, this belt can be used if any one of the following changes are made: Use fiber pulley on fan, reduce angle of drive to 60 degrees from horizontal, protect drive from dust, increase pulley diameters to 60 and 20 inches. If it is not practical to change the drive, use a 10-inch, heavy, double belt.

A limitation is necessarily set in the scope of tables of this type. Where speeds over 6000 feet per minute are reached, a leather belting manufacturer should be consulted. This same applies in cases where a pivoted base is installed with the tight side away from the pivot point.

The offer of the American Leather Belting association to render a consulting engineering service to users of leather belting where special conditions exist has been greeted with considerable enthusiasm from many men confronted with transmission problems. With modern leather belting, many applications now are being handled successfully that some years back were beyond the limitations of the product.

Install A PEABODY



TRIPLE ACTION SCRUBBER

For Cleaning Gas and Air

TRIPLE ACTION, an exclusive, patented development by Peabody, removes dust, ash and fog from gas and air with the thoroughness of three strikes on the batter.

Its effectiveness is amazing. In a recent installation, a Peabody Scrubber 4 feet by 10 feet successfully replaced a packed tower 8 feet by 130 feet high.

A Peabody cleaning unit of suitable design for your purpose can be built into any gas washer without disturbing the arrangement below, assuring clean, dry gas. Also complete new units can be furnished for any desired capacity and degree of cleaning.

PEABODY SCRUBBERS of various types and designs are working successfully in a wide range of industries: taking out tar fog from air in an asphalt plant; removing bacteria from air used in distilling; eliminating moisture and lampblack from gas required for annealing; removing fly ash, etc.

Whatever your problem in gas or air cleaning may be, it will help you to discuss it with our engineers.

PEABODY Bulletin H-201 Describes the Triple Action Scrubber Fully. Send for a Copy.

PEABODY ENGINEERING CORPORATION

580 Fifth Avenue, New York

OFFICES IN PRINCIPAL CITIES

Zinc Dust Paints

(*Concluded from Page* 43)

the standpoint of tint retention since zinc-dust in itself is a tint holding pigment and the outstanding tint retention property of zinc oxide is well known. As a precaution, however, it must be realized that color-stable tinting pigments must be used in colored zinc-dust paints.

However, since the adherence of zinc-dust paints depends upon the amount of zinc-dust in the formulation, the addition of any large amount of tinting color at the sacrifice of zinc-dust entails a loss of adherence. Tinting colors should replace zinc oxide rather than zinc-dust in the formulation. For priming galvanized iron and zinc sheets where adherence is of chief concern, the tinting pigment should not exceed 10 per cent of total pigment weight to meet federal specifications.

Commercial one-coat maintenance paints made up of a pigment combination of zinc-dust and aluminum powder have met with considerable success. The zinc-dust is included essentially for its rust inhibitive properties, the aluminum for the sheen it imparts.

For years zinc-dust paint has been used as an anticorrosive primer for steel ship hulls because it is unaffected by the alkaline salts in sea water. It has been reported that zinc-dust in the usual antifouling liquids has significant action to prevent the fouling of ships' bottoms.

The fact that zinc-dust paint is nontoxic and that excellent paints can be formulated with many of the synthetic resin vehicles now being recommended for use in underwater exposure make it particularly interesting for the inside of drinking water tanks and similar structures.

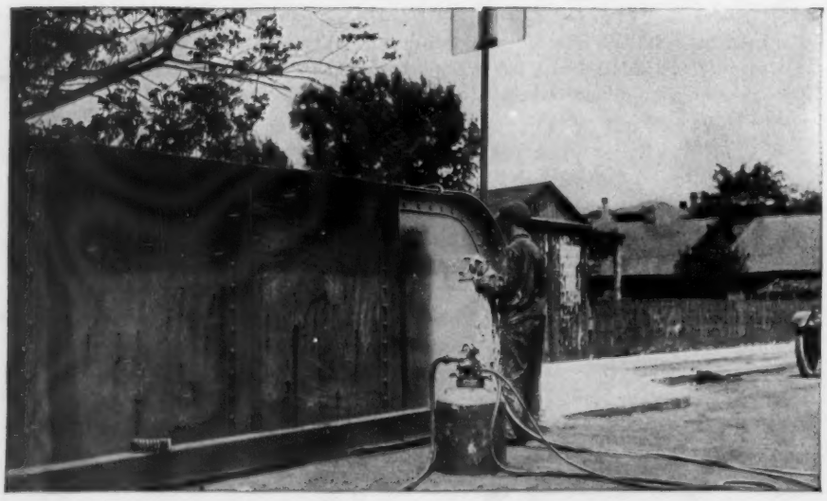
Zinc-dust zinc-oxide paint imparts a newly galvanized appearance to screens and protects them from corrosion. Since it adheres tightly to black iron, galvanized or copper screens, it prevents formation of discolored areas so often observed under screened windows.

Treatment necessary to prepare newly galvanized iron, steel and sheet zinc surfaces before painting involves merely washing the surface with toluol, light gasolene or a suitable solvent prior to painting to remove the light coating of grease normally found on such material.

Where etching or pretreatment is desired to obtain the best possible adherence, a brief weathering period of from one to three months will usually clean and etch the surface sufficiently. This method is feasible wherever painting may be delayed and has the advantage of economy.

Light sandblasting will clean and etch the surface in one operation. This method has the advantage of uniformity and enables immediate painting which should be done as promptly as possible. Ordinary acid etches are not desirable unless used under controlled conditions to insure removal of water-soluble salts and loosely adherent powder which may have a detrimental effect. Commercially pretreated galvanized sheets will produce excellent results when a zinc-dust zinc-oxide priming paint is used.

Here zinc-dust paint is being applied to a metal highway bridge in Pennsylvania. It also is widely used to protect metal cables, guard rails, signposts, culverts, etc.



Creep Data, Ferrous and Nonferrous, Is Assembled

■ *Creep Data,* 864 pages, published by American Society for Testing Materials and American Society of Mechanical Engineers, New York; supplied by STEEL, Cleveland, for $12 in the United States and Canada, $14 elsewhere; sold in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London S.W.1.

• A joint research committee of the American Society for Testing Materials and American Society of Mechanical Engineers, on the effect of temperature on the properties of metals, compiled this volume. It contains 486 sheets of test data, 273 graphs and 37 tables, covering wrought steels and ferrous alloys, cast steels and nonferrous materials.

Extensive tables give complete data on the large number of materials considered. There are charts of stress and corresponding creep rate for each type of material at each temperature; curves of temperature versus creep rate (0.10 per cent per 1000 hours) for each type of material wherever sufficient data were available; tabulated forms which give detailed descriptions of each material, including its form, heat treatment, chemistry, hardness, grain size after the McQuaid-Ehn test, impact values, initial physical properties, manufacturing data, room temperature properties of specimens after creep tests, creep characteristics, and as far as possible photomicrographs showing the initial microstructure of completed specimens.

Review Surface Hardening

(*Concluded from Page* 71)

der corrosive conditions, as for example shafts of pumps handling corrosive media, and Dr. Ihrig pointed out that one of the features of the silicon case is its ability to absorb oil which gives definite wear resistance during the running-in period. The simplest steel gives best results, for example, S.A.E. 1020. Sulphur must be low with 0.05 per cent as maximum. Malleable iron can be impregnated, but sulphur exerts a more pronounced effect than it does in steel. Plain cast iron can not be treated with satisfaction because it swells badly at the temperature employed in the process. Alloy cast irons do not respond well, the chromium types being particularly troublesome.

From the surface of the material to a depth of 0.050-inch, the impregnated silicon content varies little, thus considerable material can be machined off without losing advantage of the silicon case, Dr. Ihrig asserted. Among applications for this process are treating of cylinder liners, pipe and tubes, thermocouple tubes, pump shafts, chain links, bolts, nuts, nails, screws, etc., which must resist corrosion and in some cases wear as well.

Advertisement

COPPER ALLOY BULLETIN

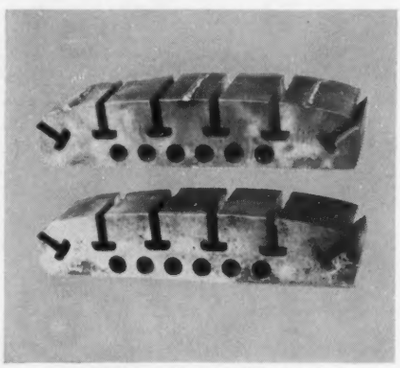
Reporting News and Technical Developments of Copper and Copper-Base Alloys

MAY "Bridgeport" BRASS CO. 1939

COIL SUPPORT ASSEMBLY SIMPLIFIED BY BRAZING

Copper brazing of steel laminations is the method developed by a large electrical manufacturer to solve the complex fabricating problem presented by the coil supports used in synchronous machinery. In many turbo generators and synchronous motors and condensers these supports must be provided with T-shaped slots for the damper winding. In the larger machines it is also necessary to use a steel coil support with a non-magnetic section.

If these supports were cast, expensive tooling would be necessary for the machining of the T-slots and the non-magnetic section. Copper brazing permits an economical assembly. Sheets of low-carbon and non-magnetic steel are punched on a press and assembled on a locating fixture. After welding across the edges of the laminations to hold them rigid, the assembly is brazed with copper saw cuttings in an atmosphere of pure dry hydrogen.



Westinghouse Electric & Manufacturing Company

Upper: Punchings are welded across the edges of laminations to hold them rigidly while being brazed. Lower: The coil support after being removed from the furnace, showing the brazed laminations bonded with copper.

Phosphor Bronze Used for Bridge Bearing Plates

Typifying the unusual combination of properties possessed by phosphor bronze is its use in the fabrication of bearing, expansion, and bed plates in bridge construction. This service requires a metal of high tensile strength and hardness, as well as good resistance to corrosion. Cold rolled phosphor bronze is especially suitable for this purpose.

EXPERT LABORATORY SERVICE SMOOTHS WAY FOR FABRICATOR OF METAL GOODS

Optimum Combination of Fabricating and Service Characteristics of Any Alloys Can Be Obtained By Closer Cooperation of Manufacturer and User

Fabricators of brass, bronze or copper goods may find through the metallurgical department of the brass mill many opportunities for improving the quality of their products and for effecting substantial savings in manufacturing costs. Although the primary functions of the laboratory are to test incoming raw materials, technically supervise the making of mill products and to check the quality and uniformity of the outgoing metals, as well as develop new alloys and improve old ones, the laboratory because of its highly specialized knowledge is often called upon to help customers in the selection of the proper alloy and temper which will give the best results. The experience gained through working on customers' problems has proved mutually beneficial.

"Special-Purpose" Alloys Developed

The published price lists, for example, contain approximately twenty per cent of the alloys which are actually active in the mill. "Ledrite" brass rod, for example, is a product specially developed for high speed screw machine operation. Although Ledrite will be found entirely satisfactory for 90% of the jobs, additional special operations such as knurling, cold heading, or rolling necessitate alloys with slightly different lead or copper contents or possibly different tempers. Such alloys are supplied if available or are specially developed by the laboratory after studying the customer's needs.

The manufacture of fancy metal boxes, such as vanity cases, lipstick containers, jewel boxes, etc., also presents a problem for both the fabricator and the mill. Since these objects, which compete with the finest jewelry in appearance, are made in quantity at an extremely low price, a brass resembling gold in color is generally used. Metal with an especially fine surface, free from scratches and blemishes, must be supplied, as such operations as matte dipping

(Continued on Following Page, Column 2)

A study of the fabricating operations plus a knowledge of the service requirements of a given job, is necessary to determine the combination of alloy, temper and surface that will insure all-round production economy and maximum service life. In these shells, all fabricated by deep drawing, laboratory control of four different alloys insures economical production and the characteristics required in each finished job.

Metal Cleaner Removes Stains and Oxides

A new substance that cleans by chemical action is reported by the manufacturer to remove oxides and stains instantly from the surface of brass, bronze, and copper. The cleaner contains no abrasives and requires no rubbing. It is applied with a brush and wiped off with a wet rag. It is further claimed to contain no free acid or caustic, so that it will not etch the surface of the metal. It can be used to render working surfaces chemically clean without leaving any gritty residue.

COPPER ALLOY BULLETIN

TYPES OF COPPER

This is the fourth of a series on the various types of copper, their relative merits and uses.

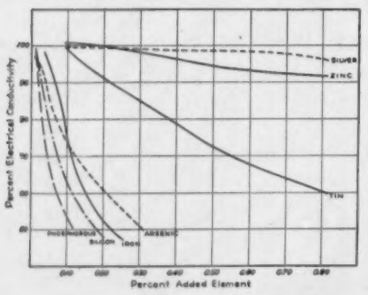
Effect of Other Elements

While oxygen in tough pitch electrolytic copper (as previously discussed) is usually the largest single impurity present, there are sometimes other elements present either by deliberate addition or incidentally to the method of refining, which have a considerable effect on the physical properties. The removal of oxygen by a deoxidizing agent results in the introduction of a small excess of the deoxidizing agent which may also affect the physical properties in various ways.

A typical example of the latter case is the presence of residual phosphorus in Deoxidized Copper. Phosphorus between 0.015% and 0.04% reduces the electrical conductivity of electrolytic copper purity from 3 to 30%, depending on the exact amount of phosphorus present. This decrease in electrical conductivity constitutes a definite objection to the use of phosphorized copper for electrical purposes. Other deoxidizers, such as silicon or zinc, have a greater or lesser tendency to reduce the electrical conductivity.

In the tough pitch coppers certain elements such as arsenic and iron, which have no tendency to deoxidize the copper, do tend to lower the electrical conductivity. Care is therefore taken to make sure that these elements are not permitted in electrolytic copper in appreciable quantities. It is the presence of arsenic in some of the Lake copper which necessitates the division between High Resistance and Low Resistance Lake Copper.

EFFECT OF ADDED ELEMENTS ON ELECTRICAL CONDUCTIVITY



LABORATORY SERVICE

(Continued from Preceding Page, Column 3)

only emphasize any imperfections. Furthermore, polishing and buffing costs must be kept to a minimum.

In order to save material and operating costs, fabricators are constantly cutting down their specifications for metal thickness and making every effort to reduce the number of annealing operations, and often to eliminate them completely. It is therefore necessary to supply thinner material with exceptionally high strength and ductility. Electric furnace brass and scientific grain structure control have made possible the fulfilment of difficult requirements.

Seamless tubing used for fabricating plumbers' brass goods, pump barrels, or parts of various kinds is another mill item which may give trouble if the customer does not tell the mill just what it is to be used for. If the tubing is to be highly polished and plated, extraordinary care must be taken to supply material with a surface free from scratches, blemishes, scale, etc. Furthermore, the tubing must be carefully handled so as not to injure it after it is made. Operations such as bending, flanging or reducing require special tempers and alloys which can be developed only through close cooperation with the laboratory. Wire for severe hot or cold heading operations or for hot forging intricate shapes must also be developed after experimentation if defective work is to be kept down to the minimum.

Just as it is good business for an individual to obtain a periodic health check-up by a competent physician, in the same way, fabricators can benefit by obtaining an occasional survey of their metal requirements by a competent metallurgical laboratory.

An open mind to the possibilities of improvement in old alloys and the economies of many new ones will often result in increased savings and higher quality. Bridgeport's laboratory services are available to customers in working toward such mutually profitable solutions to the fabricator's problems.

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. Further information on any of these items may be obtained by writing the Bridgeport Brass Company, which will gladly refer readers to the manufacturer or other source.

Chemically treated buffs are reported to give longer life against abrasive wear. They are also said to absorb polishing composition better and to give improved cutting and coloring action on the article being buffed. The chemicals used in treating the buffs include a hygroscopic substance that absorbs moisture from the air, to give a conditioned sheeting at all times. Balanced construction of the buffing textile gives longer life.

A pneumatic sanding drum uses a new style fabric band and an air tube. It is reported to produce a smooth draw file finish, and to be suitable for use on all makes of flexible shaft machines. A very smooth surface is obtained by the soft air cushion that holds the abrasive in place.

A powdered soap is said to be suitable for use in wet working of brass, bronze, and copper. Applications suggested by the manufacturer are drawing and stamping brass and copper shells, intermediate yellow brass wire and tubing, and intermediate bronze wire.

A silver brazing alloy with a medium silver content is suitable for work at a temperature of 1,175 degrees F., when used with a flux active at 1,100 degrees. It is said to produce a sound, ductile bond, and to be suitable for making joints between dissimilar metals, such as steel and copper or copper alloys.

Bronze inserts formed from wire of high tensile strength are intended for use in tapped holes in light metals, such as alloys of aluminum or magnesium. The insert is screwed into the tapped hole and becomes a permanent part of the hole. Studs or cap screws assembled into the inserts bear against the bronze instead of the softer metal of the light alloy.

A measuring machine aids in permitting measuring methods of extreme precision to be used in the shop. It makes possible direct inspection and checking of production gages with a degree of accuracy usually possible only in the laboratory.

A micrometer gage is adaptable to the measurement of internal bores ranging from 13/16 to 1⅜ inches in diameter and up to 5 inches deep. Measurement is taken across an actual diameter of the bore by means of a movable anvil which operates an amplifying mechanism and rigid adjustable anvils. Indicating scale is graduated in divisions of .0001".

An electric welder is said to have a welding range from 20 to 280 amperes with any size electrode from 1/16 to ¼ inch. Designed for A.C. only, it can be quickly changed for operation at 110 or 220 volts. Dial controls welding amperage.

PRODUCTS OF THE BRIDGEPORT BRASS COMPANY

Executive Offices: BRIDGEPORT, CONN.—Branch Offices and Warehouses in Principal Cities

SHEETS, ROLLS, STRIPS—*Brass, bronze, copper, Duronze,** for stamping, deep drawing, forming and spinning.

CONDENSER, HEAT EXCHANGER, SUGAR TUBES—For steam surface condensers, heat exchangers; oil refineries, and process industries.

PHONO-ELECTRIC* ALLOYS—High-strength bronze trolley, messenger wire and cable.

WELDING ROD—For repairing cast iron and steel, fabricating silicon bronze tanks.

LEDRITE* ROD—For making automatic screw machine products.

BRASS "Bridgeport" CO.

Established 1865

COPPER WATER TUBE AND FITTINGS—For plumbing, heating, underground piping.

DURONZE ALLOYS—High-strength silicon bronzes for corrosion-resistant connectors, marine hardware; *hot rolled sheets* for tanks, boilers, heaters, flues, ducts, flashings.

BRASS, BRONZE, DURONZE WIRE—For cap and machine screws, wood screws, rivets, bolts, nuts.

FABRICATING SERVICE DEPT.—Engineering staff, special equipment for making parts or complete items.

BRASS AND COPPER PIPE—"Plumrite"* for plumbing, underground and industrial services.

*Trade-name.

BRIDGEPORT BRASS

Markets Continue Downward Course

Coal Mining Suspension Factor in Additional Steelmaking Drop

MARKET IN TABLOID ★

Demand

Tending downward; some products are more active.

Prices

Fairly steady, considering small volume of new business.

Production

Declined 1½ points to 49 per cent.

■ ACTIVITY in steel markets continues to decline irregularly. Shrinkage in coal supplies partly is responsible for the additional letdown in demand and production, but this is a minor factor, since districts only slightly affected by the bituminous suspension also are quieter.

Some products show resistance to the downward trend in business. Bars and sheets, influenced by smaller orders from the automotive industry in recent weeks, are moving slowly, but structural shapes, concrete reinforcing bars and tin plate continue relatively active. Pipe demand also shows occasional gains.

Uncertainty still clouds the outlook, this being reflected in the small size of many orders. Consumers are keeping stocks in close balance with early needs, while reduced mill operations serve to curtail producers' inventories of finished and semifinished products. Ingot production was lowered 1½ points to 49 per cent last week and at some plants is well below the rate of finishing mill operations. Steelmaking a year ago was 32 per cent.

Automobile assemblies have started to decline. This trend is expected to continue through the remainder of this quarter and only small steel orders are looked for before June from partsmakers in connection with 1940 models. Absence of active demand from this industry is one reason for anticipating further recession in steelmaking the coming 60 days.

Motorcar output last week was off 3640 units to 86,640 but was well ahead of the 50,755 units built a year ago. Chrysler again accounted for the latest change, reducing output from 23,625 units to 19,325. General Motors increased from 34,405 to 35,005; Ford was steady at 21,460; all others rose from 10,770 to 10,850.

Europe Seeks 150,000 Tons Of Galvanized Sheets Here

Outstanding in the sheet market is an inquiry from Europe for 150,000 tons of corrugated galvanized sheets to be used in building air raid shelters. About 100,000 tons would be taken by England, 30,000 tons by Holland and the remainder divided among other buyers. Inquiries for other steel products required in European defense and rearmament activities also are said to be coming to this country as a result of inadequacy of foreign steelworks capacity.

Steel exports from the United States have been increasing lately but are smaller than a year ago. March shipments, excluding scrap, were 162,098 tons, compared with 134,777 tons in February and 188,185 tons in March, 1938. Scrap exports of 310,223 tons in March compared with 222,704 tons in February and 334,742 tons a year ago.

Pending business in shape and concrete bar markets gives assurance of sustained demand for these products for a number of weeks. New orders include 10,000 tons of bars for a government building at Washington. Bridges are prominent among heavy construction work, inquiries being headed by 28,000 tons of shapes for two structures in Maryland.

Low Prices Reflected In Steel Company Earnings

Financial reports of leading steel producers direct attention to the depressing effect of low prices on certain products, but as yet there is no talk of possible advances next quarter. Considering the restricted volume of new business current quotations are somewhat firmer than might be expected.

Steelmaking in certain districts will be curtailed further in the event of prolongation of the coal mining tieup. Pittsburgh and Youngstown areas both held at 43 per cent last week, but Chicago was down 4 points to 49½. Other reductions included 1½ points to 37 in eastern Pennsylvania, 2 points to 63 at Wheeling, 9 points to 37½ at Buffalo, 5 points to 55 at Birmingham and 2½ to 42 at St. Louis.

New England increased 8 points to 43, Cincinnati was up 6 to 52, Detroit rose 2 to 59, and Cleveland advanced 2½ to 39.

Scrap markets are slow, with weakness predominating prices. Reductions at Pittsburgh lower the scrap composite 25 cents to $14.21, a new low for the year to date. The finished steel composite is unchanged at $56.50.

COMPOSITE MARKET AVERAGES

	Apr. 29	Apr. 22	Apr. 15	One Month Ago Mar., 1939	Three Months Ago Jan., 1939	One Year Ago Apr., 1938	Five Years Ago Apr., 1934
Iron and Steel	$36.26	$36.29	$36.32	$36.40	$36.36	$38.61	$32.67
Finished Steel	56.50	56.50	56.50	56.50	56.50	61.70	53.90
Steelworks Scrap..	14.21	14.46	14.46	14.98	14.77	12.30	12.15

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	April 29, 1939	March 1939	Jan. 1939	April 1938
Steel bars, Pittsburgh	2.25c	2.25c	2.25c	2.45c
Steel bars, Chicago	2.25	2.25	2.25	2.50
Steel bars, Philadelphia	2.57	2.57	2.57	2.765
Iron bars, Terre Haute, Ind.	2.15	2.15	2.15	2.35
Shapes, Pittsburgh	2.10	2.10	2.10	2.25
Shapes, Philadelphia	2.215	2.215	2.215	2.465
Shapes, Chicago	2.10	2.10	2.10	2.30
Plates, Pittsburgh	2.10	2.10	2.10	2.25
Plates, Philadelphia	2.15	2.15	2.15	2.445
Plates, Chicago	2.10	2.10	2.10	2.30
Sheets, hot-rolled, Pittsburgh	2.15	2.15	2.15	2.40
Sheets, cold-rolled, Pittsburgh	3.20	3.20	3.20	3.45
Sheets, No. 24, galv., Pittsburgh	3.50	3.50	3.50	3.80
Sheets, hot-rolled, Gary	2.15	2.15	2.15	2.50
Sheets, cold-rolled, Gary	3.20	3.20	3.20	3.25
Sheets, No. 24, galv., Gary	3.50	3.50	3.50	3.90
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.90
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.35
Wire nails, Pittsburgh	2.45	2.45	2.45	2.75

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$37.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	37.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	37.00
Wire rods, No. 5 to $\frac{9}{32}$-inch, Pitts.	43.00	43.00	43.00	47.00

Pig Iron

	April 29, 1939	March 1939	Jan. 1939	April 1938
Bessemer, del. Pittsburgh	$22.34	$22.34	$22.34	$25.30
Basic, Valley	20.50	20.50	20.50	23.50
Basic, eastern, del. Philadelphia	22.34	22.34	22.34	25.34
No. 2 foundry, Pittsburgh	22.21	22.21	22.21	25.21
No. 2 foundry, Chicago	21.00	21.00	21.00	24.00
Southern No. 2, Birmingham	17.38	17.38	17.38	20.38
Southern No. 2, del. Cincinnati	20.89	20.89	20.89	23.89
No. 2X, del. Phila. (differ. av.)	23.215	23.215	23.215	26.215
Malleable, Valley	21.00	21.00	21.00	24.00
Malleable, Chicago	21.00	21.00	21.00	24.00
Lake Sup., charcoal, del. Chicago	28.34	28.34	28.34	30.34
Gray forge, del. Pittsburgh	21.17	21.17	21.17	24.17
Ferromanganese, del. Pittsburgh	85.33	85.27	90.25	107.77

Scrap

Heavy melting steel, Pittsburgh	$14.75	$15.75	$15.60	$12.70
Heavy melt. steel, No. 2, E. Pa.	13.50	13.375	13.25	11.56
Heavy melting steel, Chicago	12.75	14.25	13.75	11.45
Rails for rolling, Chicago	17.25	17.25	17.75	15.25
Railroad steel specialties, Chicago	14.75	16.25	16.00	13.75

Coke

Connellsville, furnace, ovens	$ 3.75	$3.75	$3.75	$4.25
Connellsville, foundry, ovens	5.00	5.00	5.00	5.25
Chicago, by-product fdry., del.	10.50	10.50	10.50	11.00

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.15c
Chicago, Gary	2.15c
Cleveland	2.15c
Detroit, del.	2.25c
Buffalo	2.15c
Sparrows Point, Md.	2.15c
New York, del.	2.39c
Philadelphia, del.	2.32c
Granite City, Ill.	2.25c
Middletown, O.	2.15c
Youngstown, O.	2.15c
Birmingham	2.15c
Pacific Coast points	2.65c

Cold Rolled

Pittsburgh	3.20c
Chicago, Gary	3.20c
Buffalo	3.20c
Cleveland	3.20c
Detroit, delivered	3.30c
Philadelphia, del.	3.52c
New York, del.	3.54c
Granite City, Ill.	3.30c
Middletown, O.	3.20c
Youngstown, O.	3.20c
Pacific Coast points	3.80c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast points	4.00c

Black Plate, No. 29 and Lighter

Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill.	3.15c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.95c
Pacific Coast	4.65c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.35c	3.95c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	23.00	28.00
Cold stp.	22.00	22.50	28.50	36.50

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c
Philadelphia, del.	2.15c
Boston, delivered	2.42c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, base	2.10c
Sparrows Point, base	2.10c
Claymont, del.	2.10c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast points	2.60c

Steel Floor Plates

Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	3.95c
Pittsburgh	3.35c

Standard Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast points	2.70c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box)

Pittsburgh, Gary, Chicago	$4.30
Granite City, Ill.	4.40

Bars

Soft Steel

(Base, 3 to 20 tons)

Pittsburgh	2.25c
Chicago or Gary	2.25c
Duluth	2.35c
Birmingham	2.25c
Cleveland	2.25c
Buffalo	2.25c
Detroit, delivered	2.35c
Philadelphia, del.	2.57c
Boston, delivered	2.62c
New York, del.	2.59c
Gulf ports	2.60c
Pacific Coast points	2.85c

Rail Steel

(Base, 15 to 50 tons)

Pittsburgh	2.10c
Chicago or Gary	2.10c
Detroit, delivered	2.20c
Cleveland	2.10c

Buffalo	2.10c
Birmingham	2.10c
Gulf ports	2.45c
Pacific coast points	2.70c

Iron

Chicago, Terre Haute	2.15c
Philadelphia	2.47c
Pittsburgh, refined	3.50-8.00c

Reinforcing

New billet, straight lengths, quoted by distributors

Chicago, Gary, Buffalo Cleve., Birm., Young., Sparrows Pt., Pitts.	2.05c
Detroit, delivered	2.15c
Gulf ports	2.40c
Pacific coast ports	2.50c
Philadelphia, del.	2.22c

Rail steel, straight lengths, quoted by distributors

Pittsburgh, Gary, Chicago, Buffalo, Cleveland, Birmingham	1.90c
Detroit, delivered	2.00c
Gulf ports	2.25c
Pacific Coast	2.35c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard wire nails	$2.45
Cement coated nails	$2.45

(Per pound)

Polished staples	3.15c
Galv. fence staples	3.40c
Galv. barbed wire, standard 12½ gage two-point hog, 80-rod spool $2.80; two-point cattle, 80-rod spool	$2.62
Annealed fence wire	2.95c
Galv. fence wire	3.35c
Woven wire fencing (base C. L. column)	67.00
Single loop bale ties, (base C. L. column)	56.00

To Manufacturing Trade

Base, Pitts. - Cleve. - Chicago-Birmingham (except spring wire)

Bright bess., basic wire	2.60c
Galvanized wire	2.65c
Spring wire	3.20c

Worcester, Mass., $2 higher on bright basic and spring wire.

Cut Nails

Carloads, Pittsburgh.....$3.60

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.70c	3.40c
Chicago	2.70c	3.40c
Gary, Ind.	2.70c	3.40c
Detroit	2.75c	*3.50c
Cleveland	2.70c	3.40c
Buffalo	2.70c	3.40c

*Delivered.

Alloy Bars (Hot)

(*Base, 3 to 25 tons*)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	2.80c
Detroit, delivered	2.90c

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo.	0.55
4600 0.20 to 0.30 Mo. 1.50-2.00 Ni.	1.10
5100 0.80-1.10 Cr.	0.45
5100 Cr. spring flats	0.15
6100 bars	1.20
6100 spring flats	0.85
Cr. N., Van.	1.50
Carbon Van.	0.85
9200 spring flats	0.15
9200 spring rounds, squares	0.40

Electric furnace up 50 cents.

Strip and Hoops

(*Base, hot-rolled, 1 to 20 tons; cold-rolled, 3 to 25 tons*)

Hot Strip, 12-inch and less

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham	2.15c
Detroit, del.	2.25c
Philadelphia, del.	2.47c
New York, del.	2.51c
Cooperage hoop, Youngs., Pitts., Chicago, Birm.	2.25c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.95c
Chicago	3.05c
Detroit, del.	3.05c
Worcester, Mass.	3.15c

Carbon	Cleve., Pitts.
0.26—0.50	2.95c
0.51—0.75	4.30c
0.76—1.00	6.15c
Over 1.00	8.35c

Worcester, Mass $4 higher.

Commodity Cold-Rolled Strip

Pitts.-Cleve.-Youngstown	3.10c
Detroit, del.	3.20c
Worcester, Mass.	3.50c

Lamp stock up 10 cents.

Rails, Fastenings

(*Gross Tons*)

Standard rails, mill	$40.00
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	39.00

Cents per pound

Angle bars, billet, mills	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chicago, Birmingham	3.15c
Tie plates, base	2.15c

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists, carloads 5% up; full containers additional 10%.

Carriage and Machine

⅛ x 6 and smaller	68.5 off
Do. larger, to 1-in.	66 off
Do. 1⅛ and larger	64 off
Tire bolts	52.5 off

Stove Bolts

In packages with nuts attached 72.5 off; in packages with nuts separate 72.5-12½ off; bulk 84 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts	60 off
Elevator bolts	60 off
Plow bolts	68.5 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
6-inch and less	67	70
⅞-1-inch	64	65
1⅛ and larger	62	62

Hexagon Cap Screws

Upset, 1-in., smaller.....67.5 off

Square Head Set Screws

Upset, 1-in., smaller	75.0 off
Headless set screws	70.0 off

Piling

Pitts., Chgo., Buffalo	2.40c
Gulf ports	2.75c

Rivets, Washers

Structural, Pittsburgh, Cleveland, Chicago	3.40c
⅞-inch and smaller, Pitts., Chi., Cleve.	65-10 off
Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 off	

Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Galv.
⅛	63½	54
¼	66½	58
1—3	68½	60½

Iron

⅜	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

Steel

2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½
9 and 10	64½	55
11 and 12	63½	54

Iron

2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

Steel

1 to 3, butt weld	67½
2, lap weld	60
2½ to 3, lap weld	63
3½ to 6, lap weld	65
7 and 8, lap weld	64
10-inch lap weld	63½
12-inch, lap weld	62½

Iron

	Blk.	Galv.
¾ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½" O. D.	13	$ 9.72	$23.71
1¾" O. D.	13	11.06	22.93
2" O. D.	13	12.38	19.35
2¼" O. D.	13	13.79	21.68
2¼" O. D.	12	15.16	.....
2½" O. D.	12	16.58	26.57
2¾" O. D.	12	17.54	29.00
3" O. D.	12	18.35	31.36
3½" O. D.	11	23.15	39.81
4" O. D.	10	28.66	49.90
5" O. D.	9	44.25	73.93
6" O. D.	7	68.14	.....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O. D.	13	$ 7.82	$ 9.01
1¼" O. D.	13	9.26	10.67
1½" O. D.	13	10.23	11.79
1¾" O. D.	13	11.64	13.42
2" O. D.	13	13.04	15.03
2¼" O. D.	13	14.54	16.76
2¼" O. D.	12	16.01	18.45
2½" O. D.	12	17.54	20.21
2¾" O. D.	12	18.59	21.42
3" O. D.	12	19.50	22.48
3½" O. D.	11	24.62	28.37
4" O. D.	10	30.54	35.20
4½" O. D.	10	37.35	43.04
5" O. D.	9	46.87	54.01
6" O. D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$42.00-43.00
4-in., Birmingham	45.00-46.00
4-in., Chicago	53.80-54.80
6-in. & over, Chicago	50.80-51.80
6-in. & over, east fdy.	46.00
Do., 4-in.	49.00

Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Rerolling Billets, Slabs

(*Gross Tons*)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Young., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

Pitts., Chi., Gary, Cleve., Young., Buffalo, Birm.	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅜-inch incl.	43.00
Do., over ⅜ to 41/64-in. incl.	48.00

Worcester up $2; Galveston up $6; Pacific Coast up $9.

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Pt.	1.90c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.75
Connellsville, fdry.	4.75- 5.50
Connell. prem. fdry.	5.75- 6.25
New River fdry.	6.50- 6.75
Wise county fdry.	5.50- 5.75
Wise county fur.	4.50- 4.75

By-Product Foundry

Newark, N. J., del.	10.88-11.35
Chi., ov., outside del.	9.75
Chicago, del.	10.50
Milwaukee, ovens	10.50
New England, del.	12.50
St. Louis, del.	11.00-11.50
Birmingham, ovens	7.00
Indianapolis, del.	10.00
Cincinnati, del.	9.75
Cleveland, del.	10.30
Buffalo, del.	10.50
Detroit, del.	10.25
Philadelphia, del.	10.65

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	16.00c
Toluol, two degree	22.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (200 lb. drums)	16.25c
Do. (450 lbs.)	15.25c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	5.75c

Per ton, bulk, f.o.b. port

Sulphate of ammonia	$28.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$22.00	$22.50	$21.50	$23.00
Birdsboro, Pa.	22.00	22.50	21.50	23.00
Birmingham, Ala.‡	17.38	.....	16.38	22.00
Buffalo	21.00	21.50	20.00	22.00
Chicago	21.00	21.00	20.50	21.50
Cleveland	21.00	21.00	20.50	21.50
Detroit	21.00	21.00	20.50	21.50
Duluth	21.50	21.50	.....	22.00
Erie, Pa.	21.00	21.50	20.50	22.00
Everett, Mass.	22.00	22.50	21.50	23.00
Granite City, Ill.	21.00	21.00	20.50	21.50
Hamilton, O.	21.00	21.00	20.50	.....
Neville Island, Pa.	21.00	21.00	20.50	21.50
Provo, Utah	19.00	.....	.....	.....
Sharpsville, Pa.	21.00	21.00	20.50	21.50
Sparrow's Point, Md.	22.00	.....	21.50	.....
Swedeland, Pa.	22.00	22.50	21.50	23.00
Toledo, O.	21.00	21.00	20.50	21.50
Youngstown, O.	21.00	21.00	20.50	21.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:

Akron, O., from Cleveland	22.39	22.39	21.89	22.89
Baltimore from Birmingham	22.78	.....	21.66	.....
Boston from Birmingham	22.12	.....	.....	.....
Boston from Everett, Mass.	22.50	23.00	22.00	23.50
Boston from Buffalo	22.50	23.00	22.00	23.50
Brooklyn, N. Y., from Bethlehem	24.50	25.00	.....	.....
Canton, O., from Cleveland	22.39	22.39	21.89	22.89
Chicago from Birminghom	†21.22	.....	.....	.....
Cincinnati from Hamilton, O.	21.24	22.11	21.61	.....
Cincinnati from Birmingham	21.06	.....	20.06	.....
Cleveland from Birmingham	21.32	.....	20.82	.....
Mansfield, O., from Toledo, O.	22.94	22.94	22.44	22.44
Milwaukee from Chicago	22.10	22.10	21.60	22.60
Muskegon, Mich., from Chicago, Toledo or Detroit	24.19	24.19	23.69	24.69
Newark, N. J., from Birmingham	23.15	.....	.....	.....
Newark, N. J., from Bethlehem	23.53	24.03	.....	.....
Philadelphia from Birmingham	22.46	.....	21.96	.....
Philadelphia from Swedeland, Pa.	22.84	23.34	22.34	.....
Pittsburgh district from Neville Island	Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	23.45	23.45	22.95	22.95

	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis, northern	21.50	21.50	21.00	. ...
St. Louis from Birmingham	†21.12	.....	20.62	.....
St. Paul from Duluth	23.63	23.63	.....	24.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $26.50, base; $27.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$20.50	Lake Superior fur.	$25.00
Pitts. dist. fur.	20.50	do., del Chicago	28.34
		Lyles, Tenn.	23.50

†Silvery

Jackson county, O., base: 6-6.50 per cent $25.50; 6.51-7—$26.00; 7-7.50—$26.50; 7.51-8—$27.00; 8-8.50—$27.50; 8.51-9—$28.00; 9-9.50—$28.50; Buffalo, $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	55.10
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	$26.00

Magnesite

Imported dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Do. domestic	40.00
Do., f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Quickset magnesite grains, f.o.b. Chewelah, Wash., net ton, bulk	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$47.00
Chem. bonded chrome	47.00
Magnesite brick	67.00
Chem. bonded magnesite	57.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$22.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail $17, barge	$18.00
No. 2 lump	18.00

Ferroalloy Prices

Ferromanganese, 78-82%, tidewater, duty pd. $80.00; Do., del. Pittsburgh 85.33

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot 28.00; Do., 26-28%, Palmerton 33.00

Ferrosilicon, 50% freight allowed, c.l. 69.50; Do., ton lot 80.50; Do., 75 per cent 126.00. Spot, $5 a ton higher.

Silicoman, 2½ carbon 88.00; 2% carbon, 93.00; 1%, 103.00. Contract ton price $11 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.60-1.65

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electrolytic, per ton, c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 10.50c; Do., ton lots 11.25c; Do., less-ton lots 11.50c

67-72% carloads, 2% carbon, per lb. contained chrome 16.50c; Do., ton lots 17.25c; Do., less-ton lots 17.75c

	Carloads	Ton lots	Less ton
2% carb.	16.50c	17.25c	17.50c
1% carb.	17.50c	18.25c	18.50c
0.10% carb.	18.50c	19.25c	19.50c
0.20% carb.	19.50c	20.25c	20.50c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40-45%, lb., con. ti., f.o.b. Niagara Falls, ton lots $1.23; Do., less-ton lots 1.25; 20-25% carbon, 0.10 max., ton lots, lb. 1.35; Do, less-ton lots 1.40. Spot 5c higher

Ferrocolumbium, 50-60%, contract, lb. con. col., f.o.b. Niagara Falls $2.25; Do, less-ton lots 2.30. Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton $142.50; Do, spot 145.00; Do, contract, ton lots 145.00; Do, spot, ton lots 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50; Do, spot 160.00; Do, contract, ton lots 160.00; Do, spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c; Do, ton lots 8.00c; Do, less-ton lots 8.50c. Spot ½c lb. higher

Chromium Briquets, contract, any quantity, freight allowed, lb. 7.25c; Do, spot carlots, bulk 7.50c; Do, ton lots 8.00c; Do., less-ton lots 8.25c

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.00; Do, smaller lots 2.10

Vanadium Pentoxide, contract, lb. contained $1.10; Do, spot 1.15

Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome 80.00c; Do, spot 85.00c

88% chrome, contract 79.00c; Do, spot 84.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ⅛-in., lb. 14.00c; Do, 2% 12.50c. Spot ¼c higher

Silicon Briquets, contract carloads freight allowed, ton $69.50; Carload, spot 74.50; Less-ton lots, lb. 3.75c

Manganese Briquets, contract carloads, bulk freight allowed, lb. 4.50c; Ton lots 5.00c; Less-ton lots 5.25c. Spot ¼c higher

Zirconium Alloy, 12-15%, contract, carloads, gross ton $97.50; Do, spot 102.50

34-40%, contract, carloads, lb., alloy 14.00c; Do, ton lots 15.00c; Do, less-ton lots 16.00c. Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60; Do, 100-200 lb. lots 2.75; Do, under 100-lb. lots 3.00

Molybdenum Oxide Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant 80.00c

—The Market Week—

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets Hot Rolled	Sheets Cold Rolled	Sheets Galv. No. 24
Boston	3.98	4.21	5.21	3.85	3.85	5.66	3.86	4.93	4.61
New York (Metropolitan)	3.94	4.11	4.11	3.76	3.75	5.56	3.40	4.60	4.50
Philadelphia	3.60	3.60	4.10	3.40	3.40	5.00	3.40	....	4.43
Baltimore	3.80	3.95	4.35	3.65	3.65	5.00	3.70	5.05	4.30
Norfolk, Va.	4.00	4.15	....	3.85	3.85	5.20	3.90	....	5.40
Buffalo	3.60	3.97	3.97	3.77	3.55	5.40	3.50	4.55	4.40
Pittsburgh	3.60	3.75	3.75	3.55	3.55	5.15	3.50	4.60	4.50
Cleveland	3.50	3.65	3.65	3.55	3.73	5.33	3.50	4.70	4.62
Detroit	3.43	3.58	3.83	3.75	3.80	5.42	3.58	4.65	4.74
Cincinnati	3.85	3.82	3.82	3.80	3.83	5.43	3.57	....	4.57
Chicago	3.60	3.75	3.75	3.55	3.55	5.15	3.50	4.45	4.50
Minneapolis	3.85	4.00	4.00	3.80	3.80	5.40	3.75	5.10	4.75
Milwaukee	3.73	3.88	3.88	3.68	3.68	5.28	3.63	4.58	4.63
St. Louis	3.72	3.87	3.87	3.47	3.47	5.07	3.53	4.47	4.53
Kansas City	4.15	4.30	4.30	4.10	4.10	5.70	4.10	....	4.75
Memphis	4.00	4.15	4.15	3.95	3.95	5.71	3.90	....	5.25
Chattanooga	3.90	4.05	4.05	3.85	3.85	5.80	3.80	....	4.40
Tulsa, Okla.	4.64	4.79	4.79	4.41	4.41	6.01	4.47	....	5.47
Birmingham, Ala.	3.50	3.65	3.65	3.45	3.45	5.83	3.40	....	4.75
New Orleans	3.85	4.65	4.65	3.80	3.80	5.75	4.10	....	4.60
Houston, Tex.	3.50	5.85	6.25	4.05	4.05	5.65	3.95	....	5.25
Seattle	3.65	3.85	5.20	3.40	3.50	5.25	3.95	....	4.75
Portland, Oreg.	4.00	4.40	6.10	4.00	4.00	5.50	3.95	6.50	4.75
Los Angeles	4.00	4.50	6.35	4.00	4.00	6.20	4.20	6.30	4.75
San Francisco	3.65	4.05	6.00	3.60	3.60	5.20	3.60	6.40	5.15

	Cold Rolled Strip	Cold Finished Bars	SAE Hot-rolled Bars (Unannealed) 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series	SAE Cold Drawn Bars 2300	SAE Cold Drawn Bars 3100
Boston	3.61	4.18	4.28	7.65	6.25	6.00	8.05	8.73	7.33
New York	3.66	4.14	4.14	7.50	6.10	5.85	....	8.69	7.29
Philadelphia	3.66	4.11	3.85	7.46	6.06	5.81	8.71	....	....
Baltimore	....	4.10	3.95	....	....	....	....	....	....
Norfolk, Va.	....	4.20	....	....	....	....	....	....	....
Buffalo	3.57	3.80	3.80	7.25	5.85	5.60	7.65	8.25	6.85
Pittsburgh	3.35	3.70	3.80	7.35	5.95	5.70	7.75	8.35	6.95
Cleveland	3.35	3.80	3.70	7.45	6.05	6.05	7.85	8.25	6.85
Detroit	3.55	3.85	3.58	7.57	6.17	5.92	7.39	8.55	7.15
Cincinnati	3.60	4.05	3.90	7.59	6.19	5.94	8.99	8.60	7.20
Chicago	3.65	3.80	3.80	7.25	5.85	5.60	7.65	8.25	6.85
Minneapolis	....	4.39	4.00	7.60	6.20	8.79	9.34	8.94	7.54
Milwaukee	....	3.93	3.93	7.48	6.08	5.83	7.88	8.48	7.08
St. Louis	3.76	4.07	3.92	7.62	6.22	5.97	8.02	8.62	7.22
Kansas City	4.46	4.60	....	....	....	....	....	....	....
Memphis	....	4.61	....	....	....	....	....	....	....
Chattanooga	....	4.44	....	....	....	....	....	....	....
Tulsa, Okla	....	4.84	....	....	....	....	....	....	....
Birmingham, Ala.	....	4.48	....	....	....	....	....	....	....
New Orleans	5.00	5.10	....	....	....	....	....	....	....
Seattle	....	5.60	5.65	....	7.80	7.65	8.45	....	....
Portland, Oreg.	....	5.60	6.10	9.00	8.00	7.85	8.70	....	....
Los Angeles	4.45	6.50	4.65	9.40	8.55	8.40	9.05	10.40	9.55
San Francisco	*9.30	6.55	5.20	9.65	8.80	8.65	9.30	10.65	9.80

* Based on minimum quantity.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, April 27

Export Prices f. o. b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports £ s d		Quoted in dollars at current value	Continental Channe or North Sea ports, gross tons **Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Si.	$23.45	5 0 0	$17.89	2 2 0
Basic bessemer	....	.....	16.61	1 19 0
Hematite, Phos. .03-.05	26.97	5 15 0*	.....	.....
Billets	$34.59	7 7 6	$38.34	4 10 0
Wire rods, No. 5 gage	53.35	11 7 6	42.60	5 0 0
Standard rails	$44.56	9 10 0	$48.99	5 15 0
Merchant bars	2.30c	11 0 0	1.85c to 1.95c	4 15 0 to 5 0 0
Structural shapes	2.09c	10 0 0	1.85c to 1.90c	4 15 0 to 4 17 6
Plates, †¼ in. or 5 mm.	2.29c	10 18 9	2.10c to 2.34c	5 7 6 to 6 0 0
Sheets, black, 24 gage or 0.5 mm	2.72c	13 0 0	3.02c	7 15 0*
Sheets, gal., 24 ga., corr.	3.29c	15 15 0	3.61c	9 5 0
Bands and strips	2.77c	13 5 0	2.00c to 2.05c	5 2 6 to 5 5 0
Plain wire, base	4.08c	19 10 0	2.39c to 2.83c	6 2 6 to 7 5 0
Galvanized wire, base	4.86c	23 5 0	3.07c to 3.17c	7 17 6 to 8 2 6
Wire nails, base	.....		2.73c to 2.93c	7 0 0 to 7 10 0
Tin plate, box 108 lbs.	$ 4.73	1 0 3	.....	.....

British ferromanganese $80.00 delivered Atlantic seaboard duty-paid.

Domestic Prices at Works or Furnace—

Last Reported

	£ s d		French Francs		Belgian Francs		Reich Mark
Fdy. pig iron, Si. 2.5	$23.22	4 19 0(a)	$16.44	620.50	$15.21	450	$25.26	63
Basic bess. pig iron	21.69	4 12 6(a)	.....	...	.....	...	27.86(b)	69.50
Furnace coke	5.39	1 4 2	5.96	225	6.83	202	7.62	19
Billets	34.59	7 7 6	25.04	945	29.07	860	38.69	96.50
Standard rails	1.99c	9 10 0	1.56c	1,300	2.06c	1,375	2.38c	132
Merchant bars	2.42c	11 12 0††	1.44c	1,202	1.65c	1,100	1.98c	110
Structural shapes	2.17c	10 8 0††	1.41c	1,173	1.65c	1,100	1.93c	107
Plates, †¼-in. or 5 mm	2.29c	10 19 3††	1.82c	1,515	2.06c	1,375	2.29c	127
Sheets, black	3.08c	14 15 0§	2.17c	1,805‡	2.36c	1,575‡	2.59c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm	3.61c	17 5 0	3.30c	2,750	4.13c	2,750	6.66c	370
Plain wire	4.08c	19 10 0	1.92c	1,600	2.48c	1,650	3.11c	173
Bands and strips	2.58c	12 7 0††	1.71c	1,340	1.95c	1,300	2.29c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed. ††Rebate of 15s on certain conditions.

**Gold pound sterling carries a premium of 75 per cent over paper sterling.

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; †indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1	†12.00
Bos. dock No. 1 exp.	13.75-14.00
New Eng. del. No. 1	14.00
Buffalo, N. 1	13.50-14.00
Buffalo, No. 2	11.50-12.00
Chicago, No. 1	12.50-13.00
Chicago, auto, no alloy	11.00-11.50
Chicago, No. 2 auto	10.00-10.50
Cincinnati, dealers	10.75-11.25
Cleveland, No. 1	13.50-14.00
Cleveland, No. 2	12.50-13.00
Detroit, No. 1	10.00-10.50
Detroit, No. 2	8.50- 9.00
Eastern Pa., No. 1	15.50
Eastern Pa., No. 2	13.50
Federal, Ill.	11.00-11.50
Granite City, R. R.	11.50-12.00
Granite City, No. 2	10.50-11.00
Los Angeles, No. 1	12.50-13.50
Los Angeles, No. 2	11.00-11.50
N. Y. dock No. 1 exp.	12.00-12.50
Pitts., No. 1 (R. R.)	16.00-16.50
Pittsburgh, No. 1	14.50-15.00
Pittsburgh, No. 2	13.50-14.00
St. Louis, R. R.	12.00-12.50
St. Louis, No. 2	10.50-11.00
San Francisco, No. 1	13.00-13.50
Seattle, No. 1	12.00
Toronto, dirs. No. 1	9.75-10.25
Valleys, No. 1	14.00-14.50

COMPRESSED SHEETS

Buffalo	12.00-12.50
Chicago, factory	11.75-12.25
Chicago, dealer	10.75-11.25
Cincinnati, dealers	10.50-11.00
Cleveland	12.75-13.25
Detroit	11.00-11.50
E. Pa., new mat.	15.50
E. Pa., old mat.	11.00-11.50
Los Angeles	12.50-13.00
Pittsburgh	14.50-15.00
St. Louis	9.50-10.00
Valleys	13.50-14.00

BUNDLED SHEETS

Buffalo, No. 1	11.50-12.00
Buffalo, No. 2	10.50-11.00
Cleveland	10.00-10.50
Los Angeles	14.00
Pittsburgh	13.50-14.00
St. Louis	7.00- 7.50
Toronto, dealers	8.25

SHEET CLIPPINGS, LOOSE

Chicago	8.00- 8.50
Cincinnati, dealers	6.25- 6.75
Detroit	7.75- 8.25
†Los Angeles	3.75- 4.00
St. Louis	6.00- 6.50

BUSHELING

Buffalo, No. 1	11.50-12.00
Chicago, No. 1	11.25-11.75
Cincin., No. 1, deal.	7.00- 7.50
Cincinnati, No. 2	2.00- 2.50
Cleveland, No. 2	8.00- 8.50
Detroit, No. 1, new	10.00-10.50
Valleys, new, No. 1	13.25-13.75
Toronto, dealers	4.25- 4.75

MACHINE TURNINGS (Long)

Birmingham	†4.50- 5.00
Buffalo	6.50- 7.00
Chicago	6.50- 7.00
Cincinnati, dealers	4.25- 4.75
Cleveland	7.50- 8.00
Detroit	5.00- 5.50
Eastern Pa.	8.50- 9.00
Los Angeles	4.50- 5.00
New York	†3.50- 4.00
Pittsburgh	9.50-10.00
St. Louis	3.50- 4.00
Toronto, dealers	4.25- 4.75
Valleys	8.50- 9.00

SHOVELING TURNINGS

Buffalo	8.00- 8.50
Cleveland	8.00- 8.50
Chicago	7.50- 8.00
Detroit	6.00- 6.50
Pitts., alloy-free	10.50-11.00

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	2.00
Buffalo	6.75- 7.25
Cincinnati, dealers	3.00- 3.50
Cleveland	8.00- 8.50
Eastern Pa.	6.50- 7.00
Detroit	5.75- 6.25
New York	†2.50- 3.00
Pittsburgh	8.25- 8.75
Toronto, dealers	5.25- 5.75

AXLE TURNINGS

Boston district	†7.50
Buffalo	9.50-10.00
Chicago, elec. fur.	12.50-13.00
East. Pa., elec. fur.	13.50
St. Louis	9.00- 9.50
Toronto	4.50- 4.75

CAST IRON BORINGS

Birmingham	†6.00- 6.50
Boston dist. chem.	†5.00
Buffalo	6.75- 7.25
Chicago	5.50- 6.00
Cincinnati, dealers	3.00- 3.50
Cleveland	8.00- 8.50
Detroit	5.75- 6.25
E. Pa., chemical	10.00-11.00
New York	†3.50- 4.00
St. Louis	2.50- 3.00
Toronto, dealers	4.25- 4.75

RAILROAD SPECIALTIES

Chicago	14.50-15.00

ANGLE BARS—STEEL

Chicago	15.00-15.50
St. Louis	13.00-13.50

SPRINGS

Buffalo	16.00-16.50
Chicago, coil	15.50-16.00
Chicago, leaf	14.50-15.00
Eastern Pa.	17.50-18.00
Pittsburgh	17.50-18.00
St. Louis	14.00-14.50

STEEL RAILS, SHORT

Birmingham	†12.00-12.50
Buffalo	17.00-17.50
Chicago (3 ft.)	15.50-16.00
Chicago (2 ft.)	16.00-16.50
Cincinnati, dealers	16.25-16.75
Detroit	16.50-17.00
Los Angeles	15.00-15.50
Pitts., 3 ft. and less	18.00-18.50
St. Louis, 2 ft. & less	16.25-16.75

STEEL RAILS, SCRAP

Boston district	†13.50-14.00
Buffalo	16.00-16.50
Chicago	13.00-13.50
Cleveland	16.50-17.00
Pittsburgh	16.75-17.25
St. Louis	13.00-13.50
Seattle	16.00

FROGS, SWITCHES

Chicago	12.50-13.00
St. Louis, cut	13.00-13.50

ARCH BARS, TRANSOMS

St. Louis	13.50-14.00

PIPE AND FLUES

Chicago, net	7.50- 8.00
Cincinnati, dealers	6.25- 6.75

RAILROAD GRATE BARS

Buffalo	10.00-10.50
Chicago, net	7.50- 8.00
Cincinnati, dealers	5.75- 6.25
Eastern Pa.	13.00
New York	†8.50- 9.00
St. Louis	8.00- 8.50

RAILROAD WROUGHT

Birmingham	†11.00-11.50
Boston district	†9.50-10.00
Eastern Pa., No. 1	16.00-16.50
St. Louis, No. 1	9.75-10.25
St. Louis, No. 2	11.50-12.00

FORGE FLASHINGS

Boston district	†8.50
Buffalo	11.50-12.00
Cleveland	11.50-12.00
Detroit	9.00- 9.50
Los Angeles	9.00
Pittsburgh	14.00-14.50

FORGE SCRAP

Boston district	†6.50
Chicago, heavy	15.50-16.00

LOW PHOSPHORUS

Buffalo, crops	16.50-17.00
Cleveland, crops	18.00-18.50
Eastern Pa., crops	17.00-17.50
Pitts., billet, bloom, slab crops	18.50-19.00

LOW PHOS. PUNCHINGS

Buffalo	15.50-16.00
Chicago	15.50-16.00
Eastern Pa., crops	17.50-18.00
Pittsburgh	17.00-17.50
Seattle	15.00

RAILS FOR ROLLING

5 feet and over

Birmingham	†14.00-15.00
Boston	15.00-15.50
Chicago	17.00-17.50
New York	†14.00-14.50
Eastern Pa.	17.00-17.50
St. Louis	16.00-16.50

STEEL CAR AXLES

Birmingham	†15.00-16.00
Buffalo	16.50-17.00
Boston district	†15.00
Chicago, net	17.50-18.00
Eastern Pa.	21.00-21.50
St. Louis	17.00-17.50

LOCOMOTIVE TIRES

Chicago (cut)	15.00-15.50
St. Louis, No. 1	12.25-12.75

SHAFTING

Boston district	†15.25-15.75
New York	†15.50-16.00
Eastern Pa.	20.50-21.00
St. Louis, 1¼-3¾"	15.50-16.00

CAR WHEELS

Birmingham	†13.50-14.00
Boston dist., iron	†11.00
Buffalo, steel	16.50-17.00
Chicago, iron	12.25-12.75
Chicago, rolled steel	14.25-14.75
Cincin., iron, deal.	12.25-12.75
Eastern Pa., iron	15.50-16.00
Eastern Pa., steel	17.50-18.00
Pittsburgh, iron	15.00-15.50
Pittsburgh, steel	17.50-18.00
St. Louis, iron	14.00-14.50
St. Louis, iron	14.00-14.50

NO. 1 CAST SCRAP

Birmingham	†13.00-13.50
Boston, No. 1 mach.	†11.00-11.50
N. Eng. del. No. 2	12.00-12.50
N. Eng. del. textile	12.50-13.00
Buffalo, cupola	14.50-15.00
Buffalo, mach.	15.50-16.00
Chicago, agri. net	9.50-10.00
Chicago, auto net	12.00-12.50
Chicago, railroad net	10.50-11.00
Chicago, mach. net	12.00-12.50
Cincin., mach. deal.	12.75-13.25
Cleveland, mach.	16.50-17.00
Eastern Pa., cupola	16.00-16.50
E. Pa., mixed yard,	14.00-14.50
Los Angeles, net	13.50-14.00
Pittsburgh, cupola	14.50-15.00
San Francisco, del.	13.50-14.00
Seattle	12.00-14.50
St. Louis, cupola	12.00-12.50
St. Louis, agri. mach.	14.00-14.50
St. L., No. 1 mach.	14.50-15.00
Toronto, No. 1, mach., net	12.25-13.25

HEAVY CAST

Boston dist. break.	†9.50
New England, del.	12.50-13.00
Buffalo, break.	11.00-11.50
Cleveland, break, net	12.50-13.00
Detroit, auto net	13.00-13.50
Detroit, break	9.50-10.00
Eastern Pa.	14.75
Los Ang., auto, net.	13.00-13.50
New York, break.	†10.50-11.00
Pittsburgh, break	13.00-13.50

STOVE PLATE

Birmingham	†7.50- 8.00
Boston district	†8.00- 8.25
Buffalo	12.50-13.00
Chicago, net	7.50- 8.00
Cincinnati, dealers	5.75- 6.25
Detroit, net	7.50- 8.00
Eastern Pa.	13.50
New York, fdy.	†10.00-10.50
St. Louis	7.50- 8.00
Toronto dealers, net	7.75- 8.25

MALLEABLE

Birmingham, R. R.	†10.50-11.00
New England, del.	14.50-15.00
Buffalo	13.50-14.00
Chicago, R. R.	14.50-15.00
Cincin., agri., deal.	10.50-11.00
Cleveland, rail	15.00-15.50
Eastern Pa., R. R.	15.00-16.50
Los Angeles	17.50-18.00
Pittsburgh, rail	15.00-15.50
St. Louis, R. R.	12.25-12.75

Iron Ore

Lake Superior Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbes.	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbes.	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56.63% con.	9.00-9.25
Cop.-free low phos. 58-60%	nominal

Foreign Ore

Cents per unit, c.i.f. Atlantic

Foreign manganiferous ore, 45.55% iron, 6-10% man. nom.	12.00
No. Afr. low phos.	12.00
Swedish low phos.	12.00
Spanish No. Africa basic, 50 to 60% nom.	9.00- 9.50
Tungsten, sh. ton. unit, duty pd. nom.	19.00-19.50
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$23.00-24.00
Molybdenum ores sulphide, per lb. molybdenum contained, f.o.b. mill	0.75

Manganese Ore

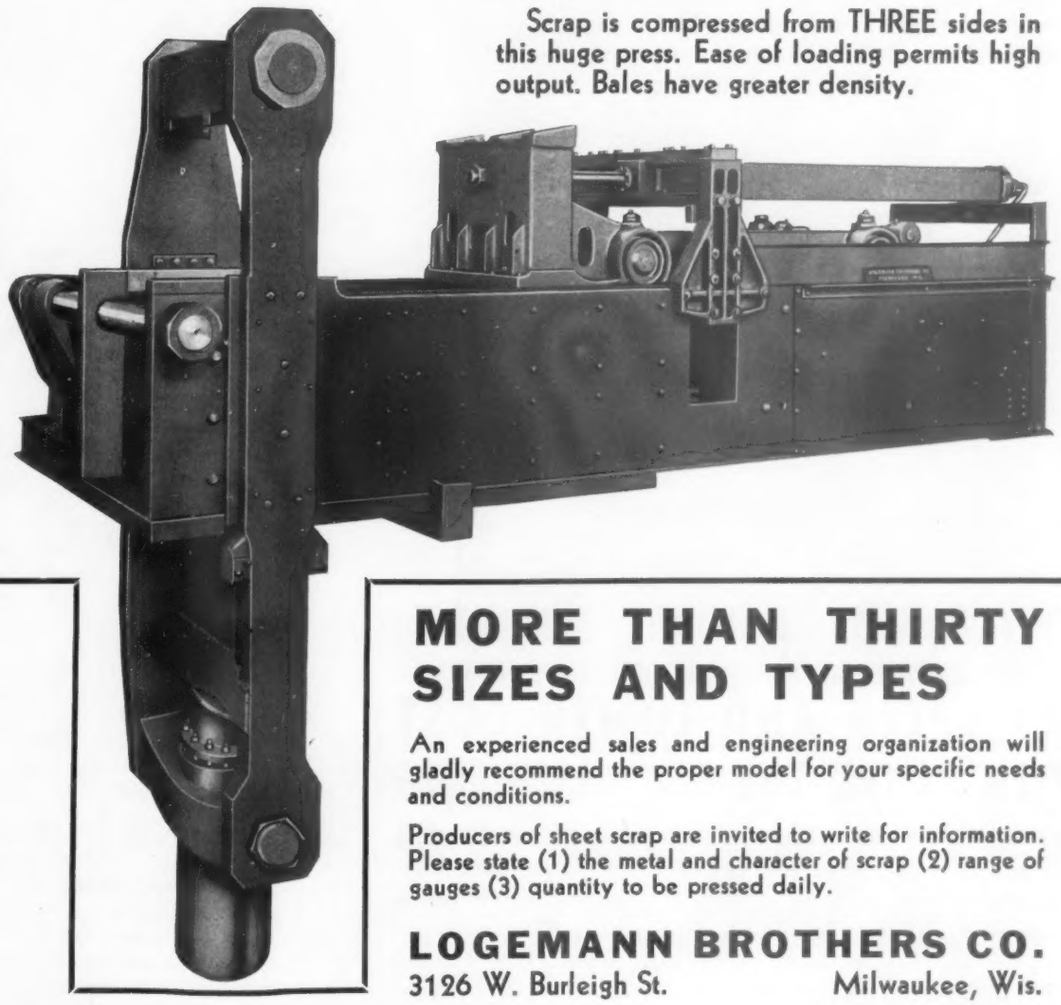
Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52% nom.	29.00
So. African, 50-52% nom.	29.00
Indian, 49-50%	27.00-28.00

LOGEMANN

SCRAP PRESSES

POWERFUL RUGGED RELIABLE



Scrap is compressed from THREE sides in this huge press. Ease of loading permits high output. Bales have greater density.

MORE THAN THIRTY SIZES AND TYPES

An experienced sales and engineering organization will gladly recommend the proper model for your specific needs and conditions.

Producers of sheet scrap are invited to write for information. Please state (1) the metal and character of scrap (2) range of gauges (3) quantity to be pressed daily.

LOGEMANN BROTHERS CO.
3126 W. Burleigh St. Milwaukee, Wis.

Baling Presses . . . Pumps . . . Straighteners . . . Accumulators . . . Valves

Sheets, Strip

Sheet & Strip Prices, Pages 82, 83

Cleveland—A few orders have been received from partsmakers for 1940 automobile models, but only small lots are involved and larger tonnages are not expected for a number of weeks. Parts manufacturing for new cars in some instances will start in May, however. Sheet and strip demand elsewhere is marked by continued cautious buying, with the tendency in total business downward.

Chicago—Sheet and strip production is following the declining trend in demand. Reduction is noted in both size and number of new orders, although business is sustained in some directions. Household equipment manufacturing accounts for a fair demand, while needs of farm equipment builders also are little changed.

Boston—Although in spots slight improvement in buying of specialty grades of narrow strip is noted, producers in the New England district find April tonnage off 10 to 15 per cent from March. Some consumers, out of the market for some time, are placing small tonnage conservatively for prompt delivery. Cold strip operations are 50 to 60 per cent of capacity with most mills. There is some scattered price shading.

New York—Negotiations were under way last week for the purchase by a number of European countries of approximately 150,000 tons of 14 gage corrugated galvanized sheets. The material would be used in the construction of air rail shelters. Of this total 100,000 tons is for England, 30,000 tons for Holland and the remainder scattered.

While part of this tonnage was reported to have been placed with a United States Steel Corp. subsidiary, negotiations still were being conducted late in the week. Early distribution of orders is expected despite divergence in price views of buyers and sellers. Based on some export offerings recently it is estimated this material would be worth about $75 a gross ton, f.a.s. eastern seaboard, or a total of $11,250,000.

April sheet business in this area was off from March, although for some sellers the decrease was small. Makers of miscellaneous stampings are among the most active consumers and are figuring on some fair-size work, including about 425 tons of hot-rolled sheets, principally 16 to 20 gage, for practice bombs. New quantity differentials so far have received little test.

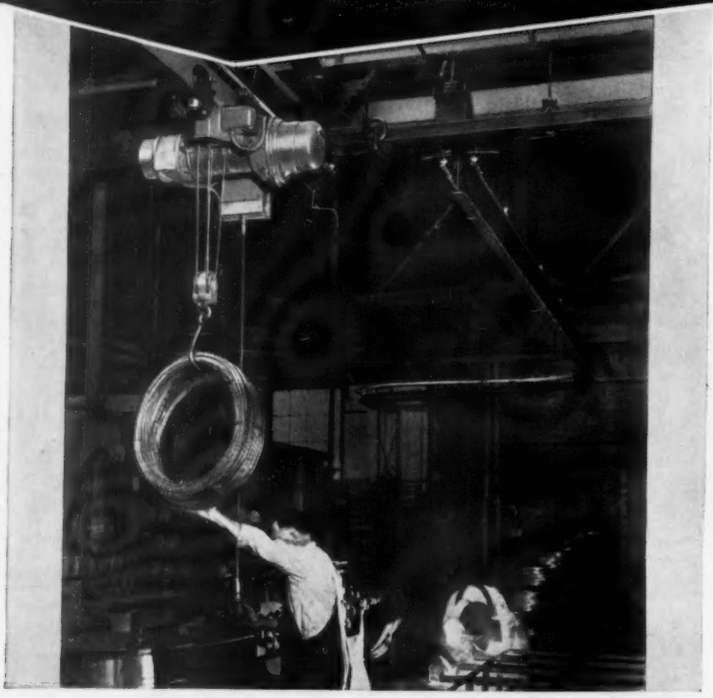
Philadelphia — April sheet sales were down rather substantially from March. Jobbers are specifying lightly and manufacturers of miscellaneous stampings are operating largely on stocks. Trading has been so light that the new schedule of quantity extras and deductions has not been tested.

Buffalo—Sheet and strip demand has tapered further. Releases from automotive interests have declined markedly. Household equipment makers are taking larger tonnages. Better business is in prospect from aircraft builders.

St. Louis—New orders and shipments have tended downward the past several weeks, the largest decrease being shown in fresh bookings. Users are holding down commitments to early requirements. Resumption of operations by several stove plants recently has stimulated flat-rolled steel shipments to that industry, but furniture and household equipment makers are less active buyers than during first quarter.

Birmingham, Ala. — Little letup is noted in demand for sheets, with

P&H HEVI-LIFT HOISTS



GET SPEED AND LOWER COST WITH "THRU-THE-AIR" HANDLING

Off the floor! . . . out of the aisles! . . . "thru the air" handling give you swift, effortless movement of loads — saves money, saves man power, saves time. P&H hoist engineers will gladly recommend the most practical material handling methods for your individual needs. Why not investigate? Or ask us to send your copy of Bulletin H-5? The Harnischfeger Corporation, 4411 W. National Ave., Milwaukee, Wisconsin.

HARNISCHFEGER CORPORATION

HOISTS • WELDING ELECTRODES • MOTORS P&H EXCAVATORS • ELECTRIC CRANES • ARC WELDERS

production remaining near capacity, manufacturers' and roofing sheets being about even. The cotton season still is awaited for an increase in demand for strip.

Plates

Plate Prices, Page 82

Pittsburgh—River craft building is featured by the placing of 30 coal barges, involving about 4500 tons of fabricated steel, by American Rolling Mill Co. Twenty will be built by Marietta Mfg. Co., ten by St. Louis Shipbuilding Co. Part of the Marietta contract is expected to be filled by units built recently for stock.

Chicago—Except for an upturn in requirements for structural work, plate demand is little changed. Public works projects are slightly less active but, with oil refinery and tank fabrication, they lend considerable support to the market. A slight bulge in railroad car needs is expected, while shipbuilding continues a factor.

Philadelphia — Plate sellers generally report a rather appreciable decline in new business last month. The Reading Co. has not yet issued releases against orders placed a week ago for plates for car repairs, the delay being due, it is said, to the coal situation. Little ship tonnage has been placed here recently and this, combined with lack of important tank and boiler work, has emphasized recent dullness.

San Francisco—Only two plate lettings of size were reported during the week. Youngstown Sheet & Tube Co. booked 500 tons for the bureau of reclamation for delivery at Sacramento, Calif., and Western Pipe & Steel Co. 275 tons for liner plates for the United States engineer office, Los Angeles. So far this year 16,307 tons have been placed, compared with 12,578 tons for the same period a year ago.

Plate Contracts Placed

500 tons, bureau of reclamation, invitation 33,119-A-1, for delivery at Sacramento, Calif., to Youngstown Sheet & Tube Co., Youngstown, Ohio.

275 tons, liner plates, United States engineer office, Los Angeles, to Western Pipe & Steel Co., Los Angeles.

Degreaser Price Reduced

Effective immediately, a reduction of 6 to 10 per cent in prices of trichlorethylene and perchlorethylene, for metal degreasing and dry cleaning, has been announced by the R.

HAVE YOU GOT ROLLER COASTER LIGHTING IN YOUR PLANT?

With lighting fixtures too far apart, poor distribution as shown in the top illustration, is the result. For best seeing conditions, the illumination in footcandles throughout the work area should be reasonably uniform. Properly spacing the lighting fixtures, as shown below, results in greater uniformity.

"ROLLER COASTER" lighting is poorly distributed or uneven lighting. When the amounts of light directly beneath a light source and midway between light sources vary greatly, you have a lighting curve that resembles a roller coaster with its sharp dips and climbs.

The extreme contrasts that exist between bright and dim areas may cause eyestrain . . . slow up production . . . increase operating errors . . . and constitute accident hazards. Seeing is difficult because workers' eyes are continually trying to adapt themselves to the many lighting conditions in the working area.

In general, direct lighting units should be spaced no further apart than their height above the floor. Where supplementary lighting is required, general lighting should also be used.

Write General Electric Co., Dept. 166-S—E, Nela Park, Cleveland, O., for the new booklet, "Lighting for Production in the Factory."

GENERAL ELECTRIC

MAZDA LAMPS

They stay brighter longer

& H. chemicals department of E. I. du Pont de Nemours & Co., Wilmington, Del.

Bars

Bar Prices, Page 82

Pittsburgh — Bar orders are off slightly, although the decline in automotive buying partially is offset by gains from miscellaneous sources. Little additional demand is expected necessary to complete production of 1939 automotive models. Business from farm equipment builders has been slightly better lately but is regarded as below normal. Merchant bar prices generally are steady.

Cleveland — Bar sales show only small change, but the trend continues downward. However, the letdown is less rapid since early April and demand occasionally gives signs of leveling off around recent levels. Orders are maintained better from miscellaneous users than from automotive interests, although the tendency to curtail the size of individual purchases as much as possible is fairly general.

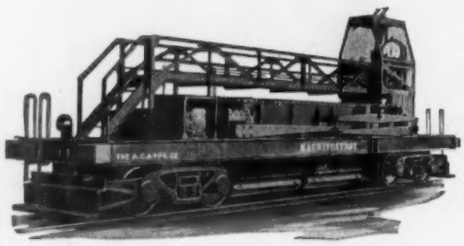
Chicago — New business in April slipped well below the March level. Demand continues widely diversified and in some instances has tended upward. Buying is for only immediate needs and stocks of some consumers are extremely low.

Quantity deductions on rail steel merchant bars, shapes and bands have been revised. Maximum deduction of 10 cents per 100 pounds now applies on orders of 75 net tons or over, compared with 150 tons and over formerly. A 5-cent deduction is effective on lots under 75 to 50 tons, instead of under 150 to 100 tons. The former 2.5-cent discount on under 100 to 50 tons has been dropped, the next classification being 50 to 15 tons, on which the base price prevails as before. Quantity extras on orders of less than 15 tons are unchanged. Deductions generally are 5 cents per 100 pounds less than those on hot-rolled billet carbon bars.

Philadelphia—While specifications from machine tool builders have been fairly steady, bar business here remains light. Lack of orders from railroads is being particularly felt, and less tonnage is coming out from shipyards, although this latter situation is regarded as only temporary. In fact, next month or so should see considerable new ship work active. Cold drawn and hot alloy bars remain relatively more active than hot carbon bars.

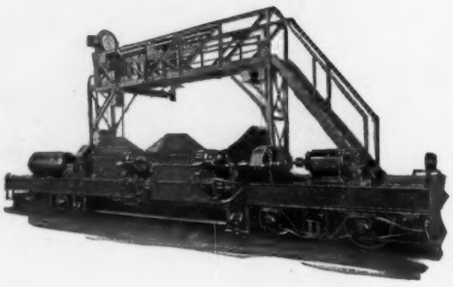
Buffalo—Bar mill operations are slightly heavier, influenced by increased output for one automotive account and by a gain in structural releases. No general upturn in demand for automotive material is in early prospect.

ATLAS SCALE CARS



20 Ton — Double Compartment Scale Car. Journals provided with self aligning anti-friction bearings. Equipped with Atlas Indicator and Recorder.

20 Ton Two Compartment Scale Car with Orr Bin Gate Operating Mechanism. Anti-friction bearings. Equipped with Atlas Indicating and Recording Mechanism.



Other Atlas Products

Gas-Electric and Diesel-Electric Locomotives—Car Pushers—Storage Battery Locomotives—Electrically Operated Industrial Cars—Scale Cars and Weighing Cars of all kinds — Ore Transfer Cars and Blast Furnace Charging Cars.

Coke Oven Equipment

Pushers and Levellers—Coal Charging Cars—Door Handling Machines — Coke Quenching Cars.

Also Atlas Patented Indicating and Recording Mechanism for Weighing Scales.

THE ATLAS CAR & MFG. CO.

Engineers . . . Manufacturers

CLEVELAND, OHIO

Pipe

Pipe Prices, Page 83

Pittsburgh—Lighter demand for oil country goods largely is responsible for a slight decline in pipe bookings the past 30 days. However, standard pipe activity has been increasing steadily, April being the best month so far this year in this respect. Gains in building construction are expected to quicken this market well into summer. Improvement in shipments to jobbers in April was more than seasonal. Demand for pressure and mechanical tubing shows little change.

Cleveland—Pipe business is moderately heavier. April made a favorable comparison with March, in

contrast to the letdown in demand for most steel products. While quiet in oil well drilling still is a retarding factor, orders for casing have improved slightly, and several small orders for line pipe lately have swelled bookings. Shipments of standard pipe are sustained in most directions and tending upward in some in response to increased movement from distributors' stocks.

New York—About 250 tons of heating and plumbing pipe for city hall, Elizabeth, N. J., will be furnished by an eastern mill. Meanwhile 900 tons of heating and plumbing pipe for Hunter college and public school and 300 tons for the Mineola, Long Island, courthouse are pending. Merchant pipe demand as a whole in April was down substantially from March.

Philadelphia — Approximately 500 tons of 38-inch steel pipe is expected to be placed shortly for the Wild Creek dam, Bethlehem, Pa. Meanwhile, 175 tons of 84-inch pipe, contract No. 3, Clark Valley dam, Harrisburg, Pa., has been placed with Bethlehem Steel Co., Bethlehem, Pa.

Birmingham, Ala.—The pipe plant outlook is steadily improving because of spotty but formidable orders. The five-day schedule remains in effect, and inquiries are improving.

Cast Pipe Placed

1000 tons, 12 to 18-inch, Oceanside, Calif., to United States Pipe & Foundry Co., Burlington, N. J.

365 tons, 6 to 12-inch, Brookline, Mass., to Donaldson Iron Works, Emaus, Pa.

110 tons, 6 to 8-inch, Woonsocket, R. I., to Warren Pipe Co., Everett, Mass.

Cast Pipe Pending

275 tons, 4 to 12-inch, San Bernardino, Calif.; bids May 2.

225 tons, 30-inch, sewage plant, New Britain, Conn.; bids in.

Steel Pipe Placed

175 tons, 84-inch pipe, contract No. 3, Clark Valley dam, Harrisburg, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

105 tons, 36-inch, for Grand Coulee dam, to Associated Pipe & Supply Co., St. Louis.

Steel Pipe Pending

500 tons, 38-inch pipe, Wild Creek dam, Bethlehem, Pa., bids in.

Tin Plate

Tin Plate Prices, Page 82

Tin plate production continues to expand gradually, being estimated at 65 per cent last week, up 2 points. Releases are gaining slowly, and although the food canning season is not due to start for another 30 days, canmakers are anticipating heavier releases of containers. Inventories of both tin plate and cans are relatively small.

Wire

Wire Prices, Page 83

Pittsburgh—Although demand for merchant wire products has leveled off, sellers look for another upturn before the season closes. Lateness of spring buying has made it difficult to anticipate needs in many sections. Business in manufacturers' wire is spotty, with miscellaneous consumers accounting for a large part. Automotive tonnage is relatively light. Manufacturers' wire prices are steady, with merchant products showing little more than usual weakness in some districts.

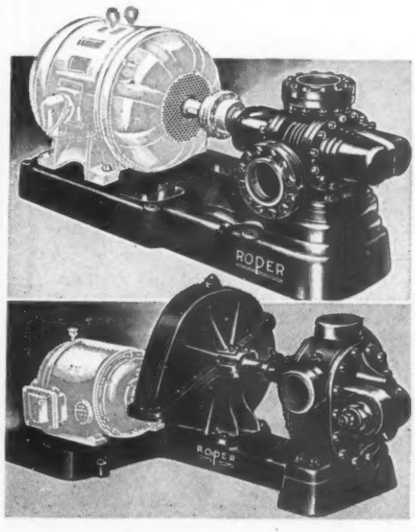
Cleveland—Wire mill operations are fairly steady, but a decrease in new business during April gives a less favorable outlook to May pro-

Faithful

Always trustworthy . . . always ready to start and finish a pumping job with the highest degree of efficiency. That's Roper Pumps!

They are engineered and built with a minimum of working parts, a stamina that assures years of service, and a smooth freedom that sets a higher maximum for speed.

If you are using Roper Pumps you know of their money-saving efficiency . . . if you're not using Ropers, won't you let us tell you how they operate with a lower power consumption and reduce costs to the lowest possible level?



● Roper Pumps are
easy to install . . .
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and Low in cost . . .

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Rockford, Illinois, U. S. A.

ROPER
Rotary PUMPS
DEPENDABLE SINCE 1857

duction. Merchant products continue to make a better showing than manufacturers' wire, the letdown in demand the past 30 days having been relatively small. Stability of prices is regarded as satisfactory, considering the volume of business.

Boston — Demand for wire products continues slack, with the aggregate volume of April business slightly below March. While orders are fairly numerous, few large releases are being made, and practically all business is for prompt delivery. Finishing operations barely hold at around 50 per cent in most departments. The drag is notably evident among some of the normally larger consumers who are buying close to requirements.

Rails, Cars

Track Material Prices, Page 83

Placing of 1000 cars by Great Northern with Pullman-Standard Car Mfg. Co., Chicago and a small tonnage of rails by Grand Trunk Western, divided between Carnegie-Illinois Steel Corp. and Inland Steel Co. constitute the only activity in railroad buying.

It is not likely the 15,000 tons of steel for 1150 cars placed by the Missouri Pacific with Mt. Vernon Car Mfg. Co. will be placed for another month. The cars are not needed at once and probably will be delivered in the fall. It is indicated about 9000 tons will be placed with Chicago mills and 6000 tons with St. Louis producers.

Placing of 600 cars for the Denver & Rio Grande Western and 1000 for the Illinois Central is expected soon.

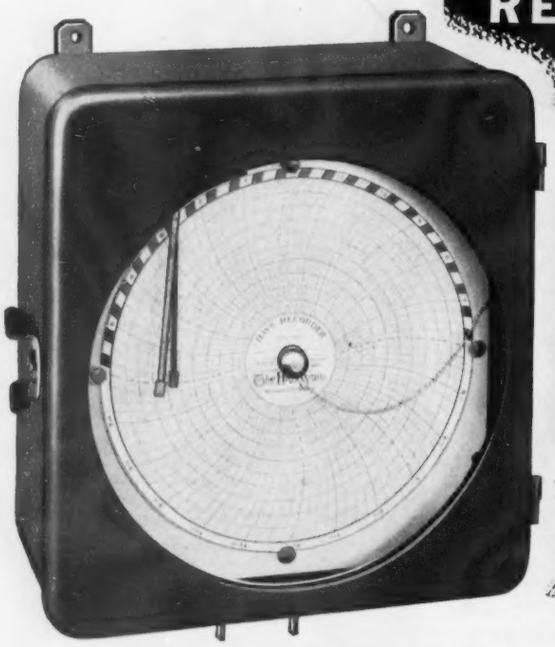
Car Orders Placed

Great Northern, 1000 fifty-ton steel box cars, to Pullman-Standard Car Mfg. Co., Chicago.

Pullman Co., two sleeping cars, to Pullman-Standard Car Mfg. Co., Chicago.

Rail Orders Placed

Grand trunk Western, 2063 tons; 1533 tons to Carnegie-Illinois Steel Corp., Pittsburgh, 530 tons to Inland Steel Co., Chicago.



ACCURATE RECORDING of DRAFT • PRESSURE and DIFFERENTIAL

Two draft values, two pressure values, two differential values, or a combination of any two of these three values may be recorded. Hays Draft Recorders are sensitive enough to register accurately increments of .0025 inches water yet are built husky enough to withstand the jars and dirt of steel mill operations.

THE OPEN HEARTH FURNACE is a very leaky structure at best. Therefore, draft conditions within the furnace are apt to be variable. The only way to prevent large leakage of gases is to maintain balanced draft conditions in the hearth.

The *Hays Series OT Supersensitive Draft Recorders* keep an accurate record of draft, pressure or differential—knowledge very essential to effective furnace operation. By connecting the instrument with the risers from the checker chambers to the furnace at a point just above the level of the charging floor a permanent record is made of pressures and drafts at these points. Balanced conditions on each end can be readily obtained and the amount of this draft is an indication of the draft on the bath.

Write for detailed information to 960 Eighth Avenue, Michigan City

The HAYS CORPORATION
SINCE 1901 COMBUSTION INSTRUMENTS AND CONTROL
MICHIGAN CITY, INDIANA, U.S.A

Shapes

Structural Shape Prices, Page 82

Pittsburgh—New projects are particularly heavy, being increased by two large bridge jobs. Tonnage for the superstructure of the Susquehanna river bridge at Havre de Grace, Md., will take 15,000 tons, while the superstructure of the Potomac river bridge between Dahlgren, Va., and Ludlow Ferry, Md., calls for 13,000 tons. The new Wilmot street bridge here, will require 2000 tons while two private jobs require 900 tons each. Volume of private work is increasing.

Chicago—Awards continue on the uptrend, lending considerable encouragement to producers witnessing slack demand for other forms of steel. Numerous substantial tonnages are pending, some of which are recent projects. Leading award involved 1500 tons for navy cranes booked by Harnischfeger Corp., Milwaukee.

New York—Orders for fabricated structural steel during March increased 10 per cent over February, according to reports received by the American Institute of Steel Construction. First quarter tonnage booked totaled 272,160 tons, against

221,721 tons in the initial quarter last year. Shipments during March were the largest of any month this year. Totals for March were: Bookings, 89,530 tons; Shipments, 122,-918 tons.

Boston — Contracts are lagging, with slack in public work outstanding. Bridge requirements include approximately 500 tons awarded for Vermont, mostly I-beam spans. District shop backlogs are light and operations are lower.

Philadelphia—Fabricators are figuring on 15,000 tons for a bridge superstructure, Havre de Grace, Md., and on a sizable tonnage for the General Federal office building, Washington, the latter up for bids May 5. Meanwhile, structural buying is light.

Buffalo — Interest is focused on the opening of bids May 4 for Buffalo's new $2,700,000 convention hall, requiring approximately 3000 tons of structural and 550 tons of reinforcing.

Seattle — Pacific Car & Foundry Co., Seattle, has orders on its books to maintain present operations for several months. Bethlehem Steel Co. will furnish 800 tons involved in transmission towers for the Bonneville authority. Contract to fabricate 425 tons for two state bridges in Montana went to Mississippi Valley Structural Steel Co., St. Louis.

San Francisco—Recent awards are light, totaling only 1168 tons. This brought the year's aggregate to 46,794 tons, compared with 43,280 tons in 1938. Consolidated Steel Corp. secured 380 tons for an addition to the Los Angeles court house and post office.

Shape Contracts Placed

3900 tons, Fifteenth street viaduct, Kansas City, Mo., to American Bridge Co., Pittsburgh.

1500 tons, navy cranes, to Harnischfeger Corp., Milwaukee.

1200 tons, building, state liquor control bureau, Harrisburg, Pa., to Bethlehem Steel Co., Bethlehem, Pa.. Through typographic error this contract was noted last week as involving 2100 tons.

1200 tons, grade separations, Cross Island parkway, Brooklyn, N. Y., for New York city parkway authority, to Bethlehem Steel Co., Bethlehem, Pa.

1200 tons, food market, Kansas City, Mo., to Mississippi Valley Structural Steel Co., St. Louis.

1150 tons, grade eliminations, contract Sc-39-5, Queens, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.

1100 tons, garage, sanitation department, 215th street and Tenth avenue, New York, to American Bridge Co., Pittsburgh; through procurement division, treasury department, New York.

1075 tons, auditorium, Bloomington, Ind., to R. C. Mahon Co., Detroit.

800 tons, transmission towers for Bonneville authority, to Bethlehem Steel Co., Bethlehem, Pa.

500 tons, factory building, for Allis-Chalmers Mfg. Co., Pittsburgh, to Bethlehem Steel Co., Bethlehem, Pa.

500 tons, post office, St. Louis, to Atlas Iron Works, St. Louis.

475 tons, north metropolitan relief sewer, contract 96A, Boston, to Commercial Shearing & Stamping Co., Boston.

475 tons, steel curbing, Brooklyn, N. Y., to Phoenix Bridge Co., Phoenixville, Pa.

450 tons, dumping platform and shed, pier 99, New York, to American Bridge Co., Pittsburgh.

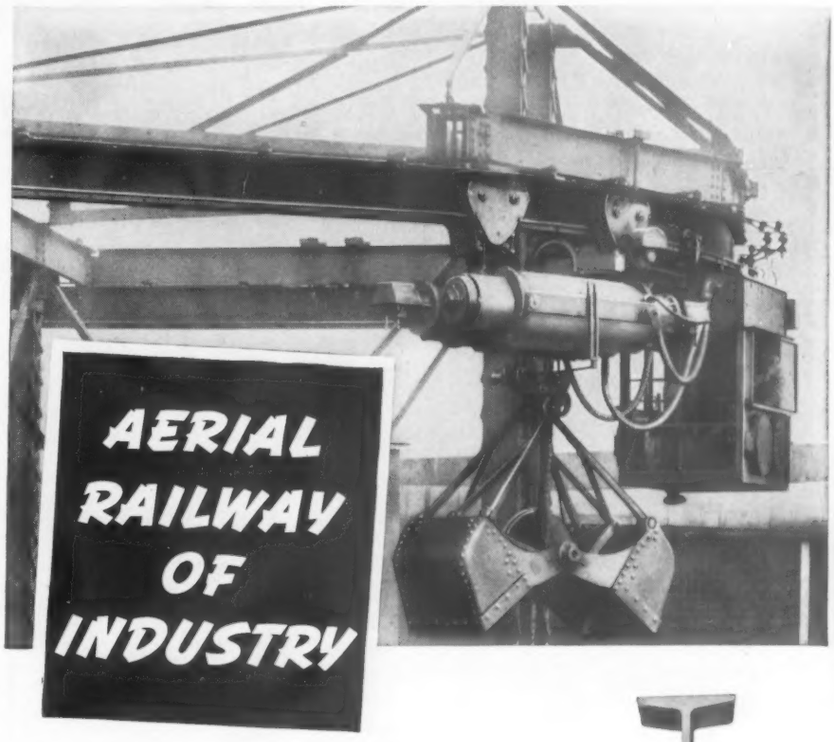
425 tons, two state bridges in Montana, to Mississippi Valley Structural

Shape Awards Compared

	Tons
Week ended April 29	20,638
Week ended April 22	*25,416
Week ended April 15	36,266
This week, 1938	22,349
Weekly average, year, 1938	21,566
Weekly average, 1939	24,704
Weekly average, March	21,240
Total to date, 1938	291,054
Total to date, 1939	*395,267

*Revised.

Includes awards of 100 tons or more.



• One Shepard Niles electric monorail hoist gives "express service", indoors or out to any point in the plant or yard carrying loads of every description. Furnished with single or double hooks in capacities from ⅛ to 10 tons.

They are also ideally suited to the accurate control of any standard electromagnet or grab bucket.

Write for catalogs illustrating and describing the "Aerial Railway of Industry".

Shepard Track consisting of two special analysis T-rails clamped to the bottom flange of a standard I-beam insures a smooth, hard, long-wearing track for monorail hoists.

A COMPLETE LINE OF CRANES & HOISTS

SHEPARD NILES CRANE & HOIST CORP.

358 SCHUYLER AVENUE . . . MONTOUR FALLS, N. Y.

Behind the Scenes with STEEL

Pittsburgh Pun

■ In from Pittsburgh last week to attend the very successful Open Hearth conference (see pages 22 and 23) came the dean of STEEL's space peddlers with a very, very lousy pun. "Make a sentence", he says, "using the word Heppenstall (*adv.*)." In exactly eight minutes we give up and he gleefully gives his version: The old timer on WPA calls the newcomer over to him and says, "What for are you workin' so hard? Why don't you get *Hepp-n-stall!*"—And to think they shot a man like Lincoln!

A Donkey Tale

■ This little yarn from *The Illinois Editor* may very well cause a few red faces but t'ain't our fault if the shoe fits.—Once upon a time a great prophet addressed a herd of donkeys: "What would a donkey require for a three-day journey?" *Six bundles of hay and three bags of dates,* they replied. "That soundeth like a fair price. But I have for only one of you a three-day journey, and I cannot give six bundles of hay and three bags of dates. Who will go for less?" Behold, all stood forth. One would go for six bundles of hay and two bags

of dates, another for three bundles of hay and one bag. And one especially long-eared donkey agreed to go for just one bundle of hay. Spake the prophet: "Thou are a disgrace to the herd, and an ass. Thou canst not live for three days on one bundle of hay, much less undertake the journey and profit thereby." *True,* replied the ass, hanging his long ears in shame, *but I wanted to get the order!* And from that day to this, price cutters have been known as asses.

Barter

■ There is a fellow down in Philadelphia who has 6000 boxes of standard wire staples with 5000 in a box, which is approximately 30 million staples. He just happened to pick them up cheap at a liquidation, he says, and would now like very much to get rid of them at maybe a small profit. We have relieved him of 20,000 of the little things in lieu of two bucks he owed us, so if you want to get in on this quick before they're all gone, let us know.

Bridge of Size

■ While writing this, we haven't yet heard what Herr Hitler had to tell his boys in the Reichstag this morning but we have been musing over the latest map of Europe on our desk. Yesterday, *Etaoin* pulled a "Do You Know?" on us to the effect that the paper used in the pages of STEEL's 12,000 copies each year would, if laid end to end, reach from Berlin to Paris. This STEEL bridge would be a little over eight feet wide and would weigh 550,000 pounds, we learn also. We are seriously considering dispatching a proposition, post haste, to Mr. Hitler to see if he would like for us to start construction.

Squelched

■ Never again will we lay ourselves so wide open to remarks such as have been tossed our way today after a little too big an evening last night. The latest crack was, "Hello, dwarf", which didn't seem to make sense and we said as much. "Makes sense to us", we were told, "you certainly look Sleepy and Dopey".

SHRDLU

Steel Co., St. Louis

400 tons, ramp connection, routes 109-149, Brooklyn, N. Y., to Fort Pitt Bridge Works, Pittsburgh, Meade Engineering Co., New York, general contractor.

400 tons, municipal water works, Grand Fork, N. D., to Pittsburgh Des Moines Steel Co., Pittsburgh.

380 tons, addition to post office and court house, Los Angeles, to Consolidated Steel Corp., Los Angeles.

370 tons, garage and office building, Newark, N. J., for state, to Lehigh Structural Steel Co., Allentown, Pa.

370 tons, laboratory, bureau of standards, Washington, to Fort Pitt Bridge Works, Pittsburgh.

325 tons, overhead crossing, Southern Pacific lines, Berkeley, Calif., for state, to Moore Dry Dock Co., San Francisco.

305 tons, boiler house, Kimberley Clark, Wis., to Lakeside Bridge & Steel Co., Milwaukee.

300 tons, state bridge over Colorado river, Kremmling, Colo., to American Bridge Co., Pittsburgh.

240 tons, building additions, North Beach airport, Queens, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.; through procurement division, treasury department, New York.

235 tons, state bridge over Shetucket river, Norwich, Conn., to Bethlehem Steel Co., Bethlehem, Pa.

225 tons, shop and warehouse, water department, Honolulu, T. H., to unnamed interest.

222 tons, highway bridge, Brady, Tex., to Central Texas Iron Works, Waco, Tex.

215 tons, St. Louis & San Francisco railroad bridge, Moselle, Ill., to Stupp Bros. Bridge & Iron Co., St. Louis.

210 tons, contract SC-39-6, 115th avenue, Queens, N. Y., to American Bridge Co., Pittsburgh.

200 tons, tunnel construction, Wrightwood avenue, Chicago, to Northern Bridge Co., Chicago.

175 tons, central school, Clyde, N. Y., to Reecon Co., Buffalo.

156 tons, state span Renton, Wash., to Pacific Car & Foundry Co., Seattle.

155 tons, bridge, FAGM 608F (L), St. Louis, to Mississippi Valley Structural Steel Co., St. Louis.

150 tons, shop building, for Charles T. Brandt Inc., Baltimore, to Maryland Steel Products Co., Baltimore.

150 tons, six oil derricks, four for General Petroleum Corp., one for Hollywood Oil Corp. and one for Allied Petroleum Corp., Long Beach, Calif., to unnamed interests.

135 tons, boiler house extension, for Tide Water Associated Oil Co., Bayonne, N. J., to Savary & Glaesser Co.

135 tons, viaduct over Missouri Pacific railroad, Murray, Nebr., for state, to Illinois Steel Bridge Co., Jacksonville, Ill.

115 tons, bureau of reclamation, erection trusses, spec. 832, Washington, to Mississippi Valley Structural Steel Co., St. Louis.

110 tons, Pennsylvania turnpike, Somerset county, Pennsylvania to Fort Pitt Bridge Works, Pittsburgh.

105 tons, factory building, St. Joseph, Mich., to Joseph T. Ryerson & Sons Co. Inc., Chicago.

105 tons, factory building, Aurora, Ill., to Hansell Elcock Co., Chicago.

Shape Contracts Pending

15,000 tons, superstructure of bridge over Susquehanna river, Havre de

Grace, Md.

13,000 tons, superstructure of bridge over Potomac river, Ludlow Ferry, Md., Dahlgren, Va., for state of Maryland.

2500 tons, Sacramento river and Doney creek bridges, Central Valley project, California; American Bridge Co., Pittsburgh, low at $294,060.

2500 tons, superstructure, Erie avenue bridge, Lorain, O.; bids May 24.

2000 tons, Wilmot street bridge, Pittsburgh.

1200 tons, piling, Cuyahoga river bridge, Cleveland, cut No. 6A, contract No. 7; bids in.

900 tons, buildings, for American Smelting & Refining Co., San Francisco.

900 tons, apartments, for Chelsea Housing Corp., Atlantic City, N. J.

600 tons, freight house, New York, for New York Central railroad.

550 tons, Commodore Perry housing project, Buffalo, John W. Cowper Co., Buffalo, low.

450 tons, bridge 36, Brighton, O., for Chesapeake & Ohio railway.

400 tons, Clarksville, Mo., upper guard wall for lock and dam No. 24, Mississippi River; bids May 9.

300 tons, buildings, contract 19, Long Island City, N. Y., for New York city Tunnel authority.

300 tons, state bridge 314, Eureka, Wis.

300 tons, mill building, for Eddy Paper Corp., Manitowoc, Wis.

275 tons, bridges, Lawrence, Mass.

250 tons, bridge over Maumee river, Toledo, O., for New York Central railroad.

220 tons, Mills bridge, Tillamook county, Oregon; Jacobsen-Jensen, 517 N. E. Stanton, Portland, Oreg. low.

215 tons, heating plant, Beltsville, Md., for United States department of agriculture.

215 tons, school building, Rensselaer, N. Y.

200 tons, shop and storage building, for Electric Boat Co., Groton, N. Y.

200 tons, three bridges, one each in Berks, Bradford, and Center counties, respectively, for the Pennsylvania State Department of Highways, bids May 5.

200 tons, building, for Beatrice B. Berle, New York.

200 tons, fish hatchery, specification 1218-D, Leavenworth, Wash.; bids May 2.

180 tons, building, Federal Department of Agriculture, Beltsville, Md.; Belmont Iron Works, Eddystone, Pa., low.

175 tons, bus terminal, for Green Bus Lines Inc., South Jamaica, N. Y.

145 tons, state bridge over Kalamazoo river, Comstock, Mich.

143 tons, underpass, Central Valley project, California, specification 1209-D; Bethlehem Steel Co., San Francisco, low.

135 tons, state bridge 1774, Alboite, Ind.

125 tons, building, for F. W. Woolworth Co., Willimantic, Conn.

125 tons, central heating plant, Storrs, Conn., for state.

115 tons, state bridge 570, Gays Mills, Wis.

115 tons, alterations to buildings, for Remsenburg, Realty Corp., Brooklyn, N. Y.

100 tons, two I-beam bridges, Berks county, Pennsylvania; bids to state highway department, Harrisburg, Pa., May 5.

Unstated, modernizing cell block and furnishing new equipment McNeil federal prison, Wash.; bids May 16.

Unstated, shapes, castings and steel frame, fish hatchery Leavenworth, Wash.; bids to Denver, May 2; Specs. 1218-D and 1219-D.

Reinforcing

Reinforcing Bar Prices, Page 83

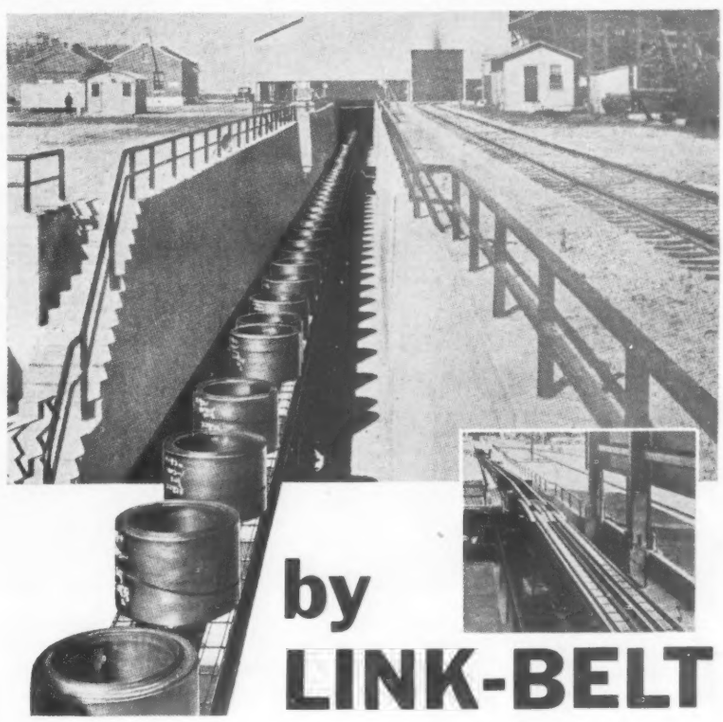
Pittsburgh—Little change is noted in volume of awards. There is still a substantial tonnage awaiting placement. Largest inquiry calls for 1400 tons for the Kittatinny-Blue Mountain tunnel, KB-2, Franklin county, Pennsylvania.

Chicago — New demand for reinforcing bars remains one of the more encouraging factors in the current outlook. Warmer weather has brought more closings, and also resulted in a further upturn in inquiries.

Boston — Inquiry is confined to small lots which are somewhat more numerous, contracts aggregating approximately 600 tons including 150 tons, aircraft factory addition, Stratford, Conn.

New York—Contracts are on the

Coil Conveyor
FOR 48" WIDE STRIP MILL



by LINK-BELT

● Here is a section of a 1008-ft. long Link-Belt conveyor which handles coils of hot strip steel weighing 6,000 to 12,600 lbs. each, from the hot strip mill to the cold reduction department of this new tin plate mill.

Enroute on the conveyor, the coils are automatically weighed and cooled. The conveyor medium consists of a double-strand of Link-Belt steel-bar-link anti-friction rolling chain.

Link-Belt—builders of chains, conveyors and power transmission equipment since 1875—has perfected an extensive line of chains for transfer tables, coil conveyors, furnace conveyors, feeder and catcher tables, sheet pilers, draw bench and other equipment, as well as complete line of chains for every power transmission service. Let a Link-Belt chain specialist recommend the best chain for your purpose.

LINK-BELT COMPANY

Chicago Pittsburgh Indianapolis Philadelphia Cleveland Detroit

Offices in Principal Cities

decline with new requirements coming out slowly, 1750 tons for additional sections, Circumferential highway, Queens, N. Y., being outstanding. The New York state highway program continues to lag while bridge and engineering needs are light.

Philadelphia — Several fair size jobs are up for figures this week, including two sections of the "all-weather" highway between Harrisburg and Pittsburgh. McCloskey & Co., general contractors, this city, have placed 250 tons of rail steel bars for an addition to the Nazareth hospital here.

Seattle — While new projects are developing slowly, several sizable contracts are pending. Bethlehem Steel Co., Seattle, is rolling between 6000 and 7000 tons for Coulee dam.

San Francisco — Awards were largest in over seven weeks and aggregated 5400 tons, bringing the total to date to 66,018 tons compared with 34,462 tons in 1938. The bureau of reclamation placed over 2800 tons for delivery at several points in Washington, with Bethlehem Steel Co. and 354 tons for delivery at Kremling, Colo. and Cody, Wyo., with Colorado Fuel & Iron Co.

Reinforcing Steel Awards

10,000 tons, Social Security and Railroad Retirement building, Washington, to Sweets Steel Co., Philadelphia; through McClosky & Co., Philadelphia.

2250 tons, housing project, New Orleans, to Henry Ericsson Co., Chicago.

1550 tons, New York approach northerly portion Harlem river speedway-George Washington bridge connection, High-bridge park, to Joseph T. Ryerson & Son Co. Inc., Chicago; through Northeastern Construction Co., New York.

589 tons, bureau of reclamation, invitations A-33,862-A also 860; 845 and 842A, Buena, Wash., to Bethlehem Steel Co., Seattle.

500 tons, addition to postoffice and court house, Los Angeles, to Consolidated Steel Corp., Los Angeles.

438 tons, bars and mesh for bridge, near Hough street, Los Angeles, for state, to unnamed interest.

350 tons, six-story office building, Bakersfield, Calif., to unnamed interest.

250 tons, bureau of reclamation, invitation 46,033-A, Kremling, Colo., to Colorado Fuel & Iron Co., Pueblo, Colo.

250 tons, addition, Nazareth hospital, Philadelphia, through McCloskey & Co., general contractors, that city, to the Sweets Steel Co., Williamsport, Pa.

220 tons, state bridge Tillamook county, Oregon, to unstated Portland jobbers; Jacobsen-Jensen Co., Portland, general contractors.

200 tons, 122nd field artillery building, Chicago, to unnamed interest.

200 tons, school buildings, Coronado, Calif., to unnamed interest.

160 tons, school, Clyde, N. Y., to Reecon Co., Buffalo.

150 tons, building, state liquor control bureau, Harrisburg, Pa., to Sweets Steel Co., Williamsport, Pa. through McCloskey & Co., Philadelphia.

150 tons, factory, United Aircraft Co., Stratford, Conn., to Truscon Steel Co., Youngstown, O.

140 tons, assembly hall for high school, Sacramento, Calif., to Palm Bridge & Iron Works, Sacramento.

140 tons, elementary school, Davenport, Iowa, to Republic Steel Corp., Cleveland.

135 tons, dormitory, South Bend, Ind., to Republic Steel Corp., Cleveland.

134 tons, bureau of reclamation, invitation 48,188-A, Cody, Wyo., to Colorado Fuel & Iron Co., Pueblo, Colo.

132 tons, highway work near Sunol, Alameda county, California, for state, to San Jose Steel Co., San Jose, Calif.

132 tons, section 8-B2, Pennsylvania turnpike commission, Somerset county, Pennsylvania, to Truscon Steel Co., Youngstown, O.

130 tons, school, North Adams, Mass., to Truscon Steel Co., Youngstown, O.

Concrete Bars Compared

	Tons
Week ended April 29	18,732
Week ended April 22	4,491
Week ended April 15	10,900
This week, 1938	8,003
Weekly average, year 1938	6,959
Weekly average, 1939	11,307
Weekly average, March	10,279
Total to date, 1938	100,127
Total to date, 1939	180,912

Includes awards of 100 tons or more.

By PAGE HI-TENSILE "G" for these best of Reasons

• **TOUGH, DUCTILE WELDS** . . Hi-Tensile "G" produces strong joints that withstand shock and strain. Tests on Hi-Tensile "G" welds show surprising elongation.

• **HIGH SPEED AT ALL CURRENT VALUES** . . Welders say that Hi-Tensile "G" can "stand the heat" better than any rod they've ever used—and that it's the "coldest-running" rod.

• **SMOOTHNESS OF BEAD** . . We know of no rod that runs more smoothly and leaves a smoother bead. Very little spatter.

• **ADAPTABILITY** . . This rod is practical for use under all conditions on production, maintenance and construction work.

BUY ACCO QUALITY *in Page Welding Electrodes, Page Chain Link Fence, Tru-Lay Preformed Wire Rope, Reading-Pratt & Cady Valves, Campbell Abrasive Cutting Machines, American Chains (Welded and Weldless) and Wright Hoists.*

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120 tons, women's dormitory, Madison, Wis., to Truscon Steel Co., Youngstown, O.

110 tons, sewage disposal plant, Bryan O., to Pollak Steel Co., Cincinnati; Marra & Son, Cleveland, contractor.

101 tons, bureau of reclamation, invitation 48,189-A, Cody, Wyo., to Bethlehem Steel Co., Bethlehem, Pa.

101 tons, Long Valley dam, Los Angeles, to unnamed interest; through general contractors, J. F. Shea Co., 617 South Olive street, Los Angeles.

100 tons, Journalist building, Minneapolis, to Bethlehem Steel Co., Bethlehem, Pa.

Reinforcing Steel Pending

3200 tons, Chicago subway section; bids May 4.

2400 tons, sewage disposal plants, Gary, Ind.; Permanent Construction Co., Chicago, low.

1750 tons, additional sections, Circumferential highway, Queens, N. Y.

1400 tons, Kittatinny-Blue mountain tunnel, KB-2, Franklin county, Pennsylvania.

960 tons, bureau of reclamation, Central Valley project, California; bids May 2.

950 tons, army barracks, Chanute field, Rantoul. Lippman Construction Co., Chicago, low.

850 tons, Wild Creek dam, Bethlehem, Pa.; bids in.

785 tons, treasury department, Los Angeles; invitation A-9153, list 304; bids opened.

782 tons, Allegheny mountain tunnel, Somerset county, Pennsylvania.

758 tons, bureau of reclamation, invitations A-33,868-A and A-28,846-A, Buena, Wash.; bids opened.

500 tons, schedule 3445, Panama Canal, C. Z.; bids opened.

500 tons, housing, Eighty-seventh street and Cottage Grove avenue, Chicago.

450 tons, estimated, $3,000,000 Glenwood housing project, Philadelphia; bids May 5.

450 tons, sewage treatment plant, Springfield, Mass.

430 tons, proposed Mark Twain hotel, Seattle; bids in to Roosevelt Building Corp., general contractor.

425 tons, sewage treatment plant, Springfield, Mass.

400 tons, Commodore Perry housing project, Buffalo; John W. Cowper Co., Buffalo, low.

375 tons, federal building Anchorage, Alaska; bids in at Washington.

350 tons, paint shop and transformer buildings, specification 8994, Mare Island, Calif.; navy yard; bids May 10.

333 tons, Kings River bridge, Tulare county, California; bids May 10.

308 tons, section 13-B, Pennsylvania turnpike commission, Bedford county, Pennsylvania.

270 tons, water filtration plant, Pawtucket, R. I.

250 tons, housing project, 25 buildings, Kokomo, Ind.

240 tons, insane hospital, Sheboygan, Wis.; bids April 28.

220 tons, Central Nebraska power and irrigation group 32-G, Hastings, Nebr.

200 tons, waste treatment plant, Standard Brands, Pekin, Ill.

186 tons, Chicago Board of Education, south side vocational school, rebidding indefinitely postponed.

160 tons, highway work, Arapahoe county, Colorado; bids opened.

140 tons, sewage plant, Manitowoc, Wis.

110 tons, viaduct, Providence, R. I.; Coleman Bros. Corp., Boston, general contractor.

100 tons, Clarksville, Mo., upper guard wall for lock and dam No. 24, Mississippi river; bids May 9.

Unstated, 19,950 pieces, for Roza project, Washington state; bids in at Denver, April 24.

Unstated, state bridges Yellowstone county and St. Regis river, Montana; bids in April 28.

Unstated, state bridge, Wallace,. Idaho; Sam Orino, Spokane, general contractor.

Unstated, addition to Yakima, Wash., postoffice; Evind Anderson, Tacoma, general contractor.

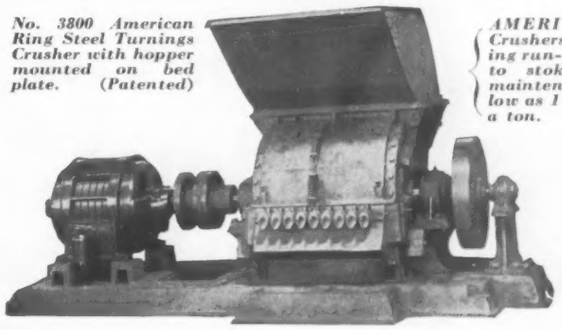
Unstated tonnage, agricultural building, Peoria, Ill.

Pig Iron

Pig Iron Prices, Page 84

Pittsburgh—Movement of pig iron to manufacturing foundries shows little change, although radiator plants are somewhat busier. One

No. 3800 American Ring Steel Turnings Crusher with hopper mounted on bed plate. (Patented)



AMERICAN Ring Crushers are crushing run-of-mine coal to stoker size at maintenance costs as low as 1/10 of a cent a ton.

EXTRA PROFITS by crushing your turnings!

Many shops and manufacturing plants are making extra profits by crushing their turnings into chips with American Ring Steel Turning Crushers. Chips not only bring a higher price, but they are easy to handle, require less storage space and are easier to ship.

Your long turnings will cease to be a nuisance after you put an American Ring Crusher on the job. It will pay for itself in a very short time, after which it will pay you a large weekly profit.

Do you want this extra profit?

ORIGINATORS OF THE ROLLING RING CRUSHER PRINCIPLE

AMERICAN PULVERIZER CO.
1539 MACKLIND AVE. — ST. LOUIS

company is preparing to open another plant shortly. Blast furnace operations have been hampered by the coal strike, but in some cases shutdowns have been caused by lack of demand as well as a desire to conserve fuel.

Cleveland—Shipments lately have declined more rapidly, indicating a reduction of 15 to 20 per cent in April deliveries compared with March. Foundry operations are tending downward, although some melters, including heating equipment interests, are maintaining schedules. Demand for automotive parts is receding, but a few foundries specializing in such work continue busy. Jobbing plants are without sufficient backlogs to permit arranging schedules more than a few days ahead.

Chicago—Shipments during April were close to 15 per cent below March. Foundry melt changed little in April, leading sellers to believe decreased shipping orders resulted mostly from reduction of inventories and not from dwindling business. Sales are spotty, most consumers being well covered. Shipments of by-product foundry coke, reflecting more directly the state of foundry operations, are substantially unchanged from March levels.

New York — Pig iron shipments and orders are tending downward. Manufacturers of building hardware and machinery are still specifying fairly well, but miscellaneous casting requirements are sufficiently small to bring down the average melt. Pig iron sellers expect little early improvement.

Philadelphia—The steel and casting melt has tapered this month, offsetting the improvement noted in March, in the experience of most producers. This is being reflected in both orders and shipments with sellers seeing little improvement ahead.

Buffalo — Shipments are unchanged, but pig iron production has been curtailed. Hanna Furnace Corp. has banked one of two blast furnaces as a "precautionary measure" to conserve fuel. Releases previously had been sufficient to prevent excessive piling of iron, indicating some working off of stocks in the near future.

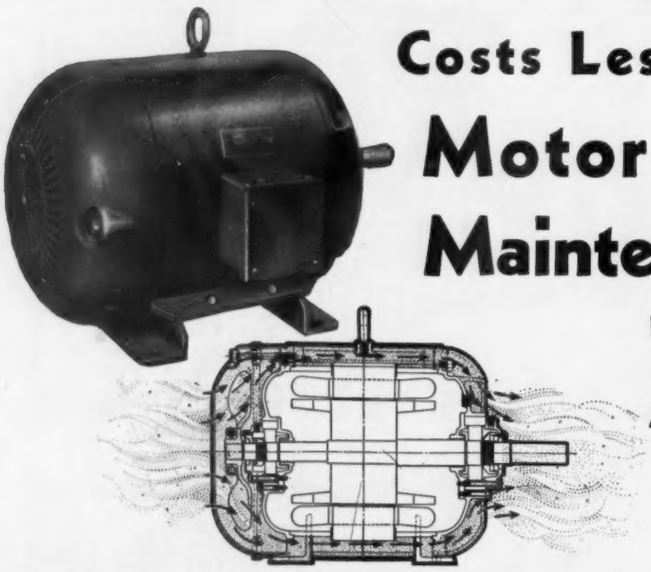
Cincinnati—April shipments were smaller than those of March, the letdown being small and spread widely, with the exception of demand from producers of machine tool castings.

St. Louis—Deliveries continue to slacken, the April movement being estimated at 10 to 15 per cent behind March although well above the tonnage a year ago. Consumption also is declining, although at a relatively slower rate. Stove foundries generally are more active, but operations are below expectations. Jobbing plant schedules vary widely. Fears of a shortage have stimulated coke production and shipments. Coal mines in nearby districts are busier as a result of the eastern suspension.

Birmingham, Ala.—Pig iron production has been off somewhat in recent weeks, and there is no evidence thus far of an early improvement.

Toronto, Ont. — Pig iron demand is spotty, with the week's sales slightly above 1200 tons. Buying is for spot delivery, with forward contracting inactive. Steelworks are busy, but foundries find little improvement in new orders and most demand is for small lots.

Motor Protection Costs Less Than Motor Maintenance



WHERE DUST AND STEEL PARTICLES ARE PRESENT

A FEW OF THE MANY OUTSTANDING FEATURES OF WAGNER TYPE CP TOTALLY-ENCLOSED FAN-COOLED MOTORS

- Rugged, welded all-steel stator with specially impregnated windings.
- Dynamically-balanced cast rotor, equipped with sturdy shaft having end-milled keyways. Full-cartridge bearings completely sealed for protection.
- Easily accessible grease plugs on both ends of motor, permitting lubrication while running.

Abrasive dust is destructive to open type motors, but harmless where Wagner CP totally-enclosed, fan-cooled motors are installed. The Wagner CP motor has two frames, an outer frame which guides a strong cooling draft over the motor and an inner frame which completely seals the vital parts of the motor against the entrance of dust, filings, fumes, moisture, and other destructive agents.

Open type motors should not be expected to operate where such atmospheric conditions prevail. Standardize on Wagner CP motors and you will discover as other motor users have already discovered that *motor protection costs less than motor maintenance.*

WRITE FOR BULLETIN 182

A 70-page bulletin completely describing Wagner type CP totally-enclosed, fan-cooled motors and other types of polyphase motors will be sent upon request. You should have a copy.

M39-10

Wagner Electric Corporation

6400 Plymouth Avenue, Saint Louis, Mo., U.S.A.

MOTORS TRANSFORMERS FANS BRAKES

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 83

Bolt and nut buying shows little improvement despite better sentiment lately, and April business was off from March. Railroad specifica-

AT THE HEART

. . . and in the heart . . .

OF CLEVELAND

A red-cap is the only taxi you need when you come to Cleveland—because Hotel Cleveland adjoins the Union Terminal. And here you're at the heart of the city — next door to everything you want to see.

But convenience is only one of many reasons you'll like Hotel Cleveland. Food we believe unequalled in hotels . . . more like a transatlantic liner . . . served in four colorful restaurants. Friendliness you'll be quick to sense . . . a *genuine* interest in seeing that you enjoy every moment in our hotel and city. A room as crisp and thoughtfully arranged as your own at home. Public rooms to match your mood —home-like quiet, restful concert music, or gay dancing.

Small wonder that Clevelanders prefer the Cleveland, and experienced travelers warmly agree with them.

HOTEL CLEVELAND *Cleveland*

tions continue relatively light though substantially better than a year ago. Shipyard releases momentarily are quiet, but the outlook is encouraging in view of the number of naval and private ships coming up for bids within a few weeks Activity in machine tool building is aiding cap screw demand.

Scrap

Scrap Prices, Page 86

Pittsburgh—No. 1 heavy melting steel is down 50 cents a ton on offers of this grade to mills at $15, although as yet not confirmed by sales. Other open-hearth grades also are lower, with No. 2 steel $14. Low phos material and railroad specialties are unchanged despite quiet demand. Supplies of No. 1 steel available at $15 are heavier than those offered at $16 a month ago.

Cleveland—Little scrap is moving, mostly to outside consuming points. Business here and in the Youngstown district is practically at a standstill. Quotations here are weak, with malleable grades off 50 cents. Youngstown prices are down 25 cents on most grades.

Chicago—Activity in scrap is confined largely to covering of recent mill purchases. Prices are unchanged. Country scrap is coming out more freely. With consumption declining little additional consumer buying is in early prospect.

Boston—The market is dull, most demand being coverage of old export orders, with foundry grades slow. Heavy breakable cast is slightly easier. One dealer continues to pay $13.75 for No. 1 steel for export and is getting tonnage at that price.

New York—Demand is inactive, eastern mills taking small shipments against old orders but placing little new business. A similar situation applies to foundries taking cast grades. Machinery cast and rerolling rails are off 50 cents, while stove plate for export is down to $9. Other export prices are unchangd.

Philadelphia — Heavy breakable cast is slightly more active, with some buying at $14.75, down 25 cents from the recent market. Machine shop turnings are nominally 50 cents lower. Domestic demand for heavy melting steel is at a standstill, with prices weak but unchanged.

Buffalo—About 5000 tons of No. 2 heavy melting steel has been sold at Syracuse for export. The scrap will move via the barge canal to Albany, N. Y. on its way to the

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Alloy and Carbon Steels.
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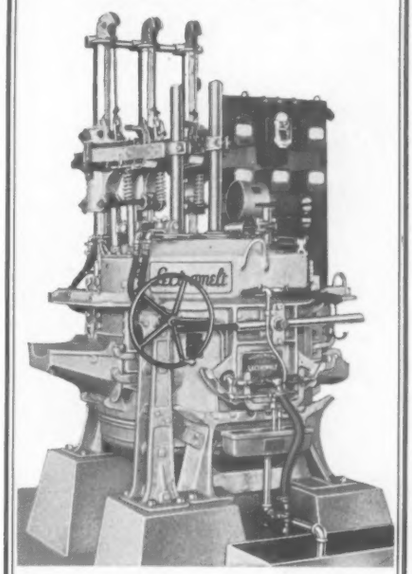

Illustration shows a 500 pound capacity 3 phase direct arc LECTROMELT furnace installed in jobbing steel foundry.

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ECONOMICAL
RUGGED

BUILT IN STANDARD SIZES
25 LBS. TO 50 TONS CAPACITY

PITTSBURGH LECTROMELT FURNACE CORP.
PITTSBURGH, PA.

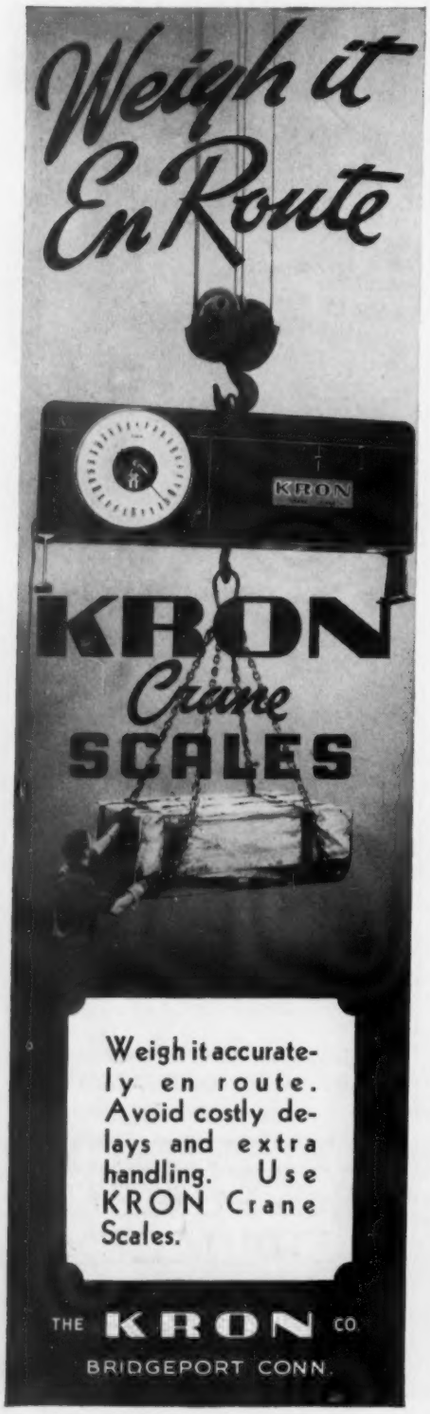
coast. Price paid was $11.25, equivalent to $13.88, delivered, Buffalo. This purchase and a few small sales of No. 1 steel to a local mill at slightly above the prevailing range of $13.50 to $14 give a better tone to the market. The first boatload of scrap reaching here this season docked recently with 2675 tons of turnings and borings.

Cincinnati—Another reduction of 25 cents in dealers' buying prices reflects market dullness. Recent railroad lists brought lower bids and some offerings were withdrawn because of unsatisfactory prices.

Detroit—Scrap continues inactive, with prices weaker, if anything. It is difficult to determine quotations accurately in the face of prolonged absence of consumer buying.

St. Louis—Heavy melting steel is unchanged on a mill purchase of 7000 to 8000 tons of No. 1 and No. 2, the former bringing $12.50. However, this represents an appreciable reduction from the last purchase.

Seattle—The export market continues firm at about $14.50 for No. 1 despite lack of new business from the Orient. Commitments are about cleaned up and the movement is expected to be small the next 60 days.



Warehouse

Warehouse Prices, Page 85

St. Louis—Warehouse trade continues dull. Oil country supplies make the best showing, with farm goods slow and railroad orders confined largely to shop materials.

Cincinnati—April sales held near the March rate. Orders show occasional gains in numbers but are smaller individually. Activity in building materials is slow to increase.

Philadelphia—Jobbers report a substantial reduction in April bookings. In some cases volume is off 15 to 20 per cent, and momentarily at least resellers contemplate no early improvement. Prices generally are unchanged.

Buffalo—Sales are slightly heavier, but changes the past few weeks have been insufficient to indicate a definite upward trend. Heavy products continue slow.

Detroit—Demand is spotty, varying sharply from day to day. Large tool and die programs are being figured by the automotive industry, but some of this business may be placed out of town.

Chicago—Business has been well sustained despite the usual month-end tapering, and in point of number of orders April is expected to compare favorably with any month since October, 1937.

Bar Iron Rates Steady

■ Monthly examination of sales sheets by representatives of Western Bar Iron association and Amalgamated Association of Iron, Steel and Tin Workers, developed a card rate of 2.25c on boiling, bar and 12-inch mills and 2.35c on guide and 10-inch, for May. This entitles puddlers to $13.05 a ton. These rates have been in effect since last July.

Steel in Europe

Foreign Steel Prices, Page 85

London—(*By Cable*)—Activities in iron and steelworks of Great Britain are expanding to meet both defense and normal commercial demand. An additional blast furnace has been lighted in the Middlesbrough district. Steelworks are working close to capacity and imports of ingot and semifinished steel are increasing, to supplement insufficient domestic production. Sheet mills are working full time. Orders

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Manager

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Single from $2.50
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DETROIT LELAND HOTEL

CASS AT BAGLEY AVE.
GARAGE IN CONNECTION

for merchant ships placed since April 1 total more than 500,000 tons.

The Continent reports exports improving in all markets, British orders being greatly increased. Price concessions are disappearing except against American and Australian competition.

Iron Ore

Iron Ore Prices, Page 86

Cleveland—Iron ore shippers are inclined to scale down previous estimates of the probable movement from the mines this season. Expectations prior to the recent unfavorable turn in business were for lake traffic of 40,000,000 to 50,000,000 tons. Ice-blocked passages at the Soo are resulting in a late start for the season, but a number of boats are expected to be under way shortly. Iron ore inquiries continue scant, partly reflecting uncertainty over consumers' requirements the ensuing 12 months.

Two of Inland Steel Co.'s ore freighters cleared for Lake Superior last week and apparently will again be the first of the season through the Soo. One of the boats, the L. E. Block, flagship of the Inland fleet, holds the ore carrying record for a single shipment from Lake Superior, last year bringing down 15,726 tons.

Of the 19,353,497 tons of iron ore shipped from the Lake Superior district in 1938, 68.5 per cent was low phosphorus nonbessemer; 4.7 per cent, high phosphorus nonbessemer; 21.8 per cent bessemer; 3.3 manganiferous, and 1.7 silicious, according to the Lake Superior Iron Ore association. The total tonnage averaged 51.9 per cent iron natural; 0.089 phosphorus; 8.25 silica; 0.81 manganese, and 10.13 moisture. The proportions and analyses have been fairly constant for a number of years.

Nonferrous Metals

Nonferrous Prices, Page 102

New York — A surprise move made by one of the leading mine producers in withdrawing from the copper market by advancing its quotation to 10.50c stimulated demand last week which in turn firmed the market at the 10.25-cent level. Tin prices advanced to new highs since 1937 while lead developed a strong undertone.

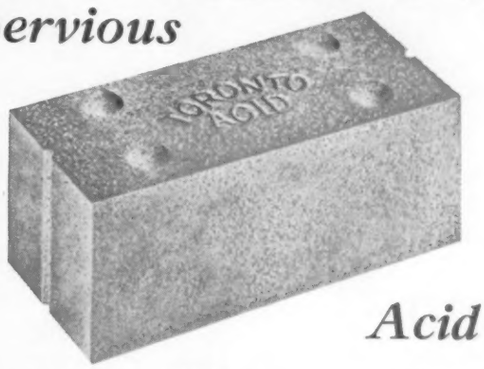
Copper — Sales last week exceeded any full month's total since last October and were estimated at around 30,000 tons. The fact that buying was not sustained after the initial spurt was disappointing to the trade since it is known that consumers' stocks are still low. Custom smelters and resellers advanced electrolytic prices to 10.25c on Wednesday while brass and bronze ingot and red metal scrap prices rose proportionately.

Tin — Consumers bought actively as a protection against possible interruption of shipments in case of European hostilities. Both London and New York markets advanced to the highest levels since 1937 with Straits spot selling up to 48.87½c, the close.

Lead — Average weekly lead sales of 10,000 tons and monthly shipments of 40,000 tons are eminently satisfactory and have strengthened prices at 4.60c, East St. Louis.

Zinc — Continued low prices in London again depressed the domestic market and prime western was unable to rise from the 4.50-cent level.

TORONTO ACID BRICK
Impervious



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MERCHANT PIG IRON DIVISION OF NATIONAL STEEL CORPORATION
Buffalo Detroit New York Philadelphia Boston

Construction and Enterprise

Ohio

CLEVELAND—City, division of light and power, is taking bids due at noon, May 5, on quantities of several types of power transformers (Order No. 425-39).

CLEVELAND—Willard Storage Battery Co. is making plans for a two-story, 40 x 300-foot factory addition costing about $125,000. P. J. Voth, Cleveland, engineer.

CLEVELAND—Tinnerman Stove & Range Co., A. H. Tinnerman, president, has awarded contract for a 50 x 100-foot factory unit estimated to cost $40,000, to Austin Co., Cleveland.

GALLIPOLIS, O.—Buckeye Rural Electric association, O. E. Elliott, president, is working on drawings and will be ready for bids about May 10 on 152 miles rural electric power transmission lines at cost of $154,000. Putnam & Woolport, Dayton, O., consulting engineers. (Noted April 3.)

MASSILLON, O.—City, Paul Smith, service director, is considering appropriation for survey for a municipal power plant. C. E. Rice, city engineer.

MEDINA, O.—Village, board of trustees, W. F. Fenton, clerk, is authorized to advertise for bids on one diesel engine and high service centrifugal pump, low service water pump and motor. Cost not to exceed $10,000.

PORT CLINTON, O.—Village, Fred Slauterbeck, mayor, will have its plans completed about June 1 for complete sanitary sewerage system and sewage disposal plant. Seeking federal funds. Consultants, Champe, Finkbeiner & Associates, Toledo, O. (Noted April 24.)

SILVER LAKE, O.—Carl J. Thomas, mayor, has plans in progress for a sewage disposal system involving pumping station, connecting sewers and incidental equipment. Consulting engineer, E. D. Barstow, Akron, O.

SOUTH WEBSTER, O.—Village, J. B. Cole, mayor, is drawing sketches and making preliminary plans for improving its waterworks and sewage disposal plant. Henry K. Martin, Portsmouth, O., consulting engineer.

STEUBENVILLE, O.—City, Eugene Boyd, service director, is completing plans and soon will receive bids on contracts 8, 9 and 10, involving sewers and sewage pumping station. Consulting engineer, H. P. Jones & Co., Toledo, O. (Noted Feb. 13.)

TOLEDO, O.—City, water division, is completing plans and will advertise for bids early in May on Contract 6 for a lake water system costing $1,500,000. Includes intake crib, conduit etc. Greeley & Hansen, Chicago, engineers.

Rhode Island

PROVIDENCE, R. I.—Brown & Sharpe Mfg. Co. is building a one-story, 62 x 177-foot factory addition, and remodeling its present plant, at total estimated cost of $40,000.

New York

BINGHAMTON, N. Y.—City has plans for purchasing a 125-kilowatt generating unit costing $25,000 for installation in the new hospital. J. A. Giles, city hall, engineer.

BUFFALO—General Mills Inc., Minneapolis, proposes to construct a plant addition costing approximately $2,000,000. Project will mature soon.

CELERON, N. Y.—Municipality will take bids during this year on a sewage disposal plant and sewers estimated to cost $108,000. William S. Lozier Inc., Rochester, N. Y., engineer.

NIAGARA FALLS, N. Y.—Great Lakes Coal & Coke Co., Chicago, will soon let contracts for a carbon plant costing more than $40,000.

New Jersey

EDGEWATER, N. J. — Lever Bros., Cambridge, Mass., has awarded contract for constructing and equipping a plant costing $1,000,000 to Stone & Webster Inc., New York. (Noted April 24.)

TRENTON, N. J.—Hamilton Township commission will soon receive bids on Contract 3, involving sewers and four pumping stations, in its $450,000 sewage disposal project. Kelly & Associates Inc., Trenton, consulting engineer.

Pennsylvania

SOMERSET, PA.—Somerset Rural Electric co-operative takes bids until about June 15 for 300 miles rural electric

Nonferrous Metal Prices

Spot unless otherwise specified. Cents per pound.

April	Copper Electro, del. Conn.	Copper Lake, del. Midwest	Copper Casting, refinery	Straits Tin, New York Spot	Straits Tin, New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
22	10.00	10.25	9.62½	48.12½	47.80	4.75	4.60	4.50	20.00	11.50	35.00
24	10.00	10.25	9.62½	48.20	47.85	4.75	4.60	4.50	20.00	11.50	35.00
25	10.00	10.25	9.62½	48.25	47.95	4.75	4.60	4.50	20.00	11.50	35.00
26	10.25	10.25	9.87½	48.45	48.00	4.75	4.60	4.50	20.00	11.50	35.00
27	10.25	10.25	9.87½	48.65	48.12½	4.75	4.60	4.50	20.00	11.50	35.00
28	10.25	10.25	9.87½	48.87½	48.40	4.75	4.60	4.50	20.00	11.50	35.00

MILL PRODUCTS

F.o.b. mill base, cents per lb, except as specified. Copper brass products based on 10.25c Conn. copper

Sheets

Yellow brass (high) 16.65
Copper, hot rolled 18.37
Lead, cut to jobbers 8.00
Zinc, 100 lb. base 9.75

Tubes

High yellow brass 19.40
Seamless copper 18.87

Rods

High yellow brass 12.00
Copper, hot rolled 14.87

Anodes

Copper, untrimmed 15.62

Wire

Yellow brass (high) 16.90

OLD METALS

Nom. Del. Buying Prices

No. 1 Composition Red Brass

New York 6.00-6.25
Cleveland 6.12½-6.37½
Chicago 6.25-6.50
St. Louis 6.00-6.25

Heavy Copper and Wire

New York, No. 1 ..... 8.00-8.12½
Cleveland, No. 1 ..... 7.62½-7.75
Chicago, No. 1 ..... 7.62½-7.87½
St. Louis 7.50-7.75

Composition Brass Borings

New York 5.25-5.50

Light Copper

New York 6.50-6.75
Cleveland 5.87½-6.00
Chicago 6.25-6.50
St. Louis 6.00-6.25

Light Brass

Cleveland 3.12½-3.37½
Chicago 4.00-4.25
St. Louis 3.50-3.75

Lead

New York 4.10-4.35
Cleveland 3.50-3.75
Chicago 3.50-3.75
St. Louis 3.50-3.75

Zinc

New York 2.50-2.62½
Cleveland 2.00-2.25
St. Louis 2.00-2.25

Aluminum

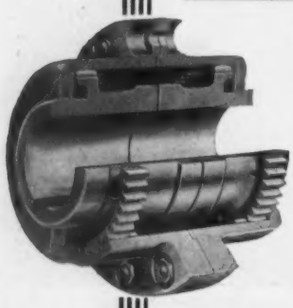
Borings, Cleveland 6.25-6.50
Mixed, cast, Cleveland 7.75-8.00
Clips, soft, Cleveland 14.75-15.00
Misc. cast, St. Louis 7.00-7.25

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads .. 10.50
Standard No. 12 aluminum 12.50-13.00

POOLE

FLEXIBLE COUPLINGS



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POOLE FOUNDRY & MACHINE CO.
Baltimore, Md.

power lines at cost of about $300,000.

Illinois

CHICAGO—Chicago Metallic Mfg. Co. is asking bids on a 65 x 100-foot factory addition costing about $40,000. A. Epstein, Chicago, architect.

Indiana

MATTHEWS, IND.—Town, J. Dunlap, clerk, receives bids on a 60,000-gallon steel water tank, pipe, hydrants, valves, turbine pump, meters etc., costing total of about $30,000. O. T. Hancock, Plainfield, Ind., consultant.

Maryland

TOWSON, MD.—Julien P. Friez & Sons Inc., Baltimore, receives bids May 8 for constructing on 18-acre site a laboratory building costing about $500,000. Whitman, Requardt & Smith, Baltimore, consulting engineers.

District of Columbia

WASHINGTON—Department of interior, Indian Service, will contract for central-heating and power plant at Navajo agency, Ft. Defiance, Ariz., including boiler units, stokers, controls, generating unit.

WASHINGTON—Navy department, bureau of supplies and accounts, will take bids until 10 a. m., May 5, on motor-driven milling machines (schedule 6161); May 9, transformers (schedule 6060); May 12, electric motors (schedule 6116), steel furnace boilers (schedule 6122) and motor-driven engine lathes (schedule 6128); May 16, pneumatic grinders (schedule 6139), electric drills (schedule 6140), and chain hoists (schedule 6168).

North Carolina

MORGANTON, N. C.—Town, B. Bristol, mayor, receives bids May 9 for materials and equipment for constructing outdoor electric substation. Includes switches, oil circuit breakers, current transformers, voltage regulators etc.

ROANOKE RAPIDS, N. C.—Halifax Paper Co. Inc. proposes to install electric power equipment in addition to its kraft paper mill. Total cost, about $75,000. J. E. Sirrine & Co., Greenville, S. C., engineers.

South Carolina

LAURENS, S. C.—Laurens County Rural Electrification co-operative, C. B. Cannon, representative, proposes to construct 150 miles of rural electric power lines. Has applied for REA allotment.

Louisiana

VILLE PLATTE, LA.—Continental Oil Co., Ponca City, Okla., plans to construct a natural gasoline plant and crude oil desalting plant at cost of about $500,000.

West Virginia

HUNTINGTON, W. VA.—American Rolling Mill Co., Middletown, O., has acquired river site and will construct a coal tipple and other loading equipment costing $360,000.

Arkansas

AUGUSTA, ARK.—Woodruff Electric Co-operative Corp. has $316,000 REA allotment and will build 355 miles rural electric lines through seven counties.

Oklahoma

GUYMON, OKLA.—General Atlas Carbon Co., Pampa, Tex., F. M. Perry, company engineer, will construct a carbon black gas plant costing an estimated $60,000.

Minnesota

GRAND RAPIDS, MINN.—United States Forest Service, regional purchasing agent, Milwaukee, takes bids to 2 p. m., May 15, on construction of a shop building, service building, sewage disposal system, mains and heating tunnel.

Texas

AUSTIN, TEX.—Lower Colorado River authority, board of directors, room 806, Littlefield building, receives bids May 15 for furnishing one 125-ton overhead traveling crane to be installed in Marshall Ford powerhouse.

ELYSIAN FIELDS, TEX.—REA has allotted an additional $26,000 to Panola-Harrison Electric Co-operative Inc. for constructing 29 miles of rural power transmission lines. Previous allotments total $176,000.

North Dakota

GRAFTON, N. DAK.—REA has allotted $229,000 to Walsh Rural Electric co-

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• JESSOP'S Yellow Label is the finest carbon tool steel made. It has been in continuous demand over a century and a half.

A perfect steel for tools and dies where freedom from risk in hardening and long life are absolutely vital.

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CINCINNATI: The Frederick Steel Co., Spring Grove & Mitchell Aves.

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AND FLANGES OF WELDED STEEL

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TEES
FLATS
ANGLES

ROUNDS
SQUARES
CHANNELS

KING FIFTH WHEEL COMPANY

5027 BEAUMONT AVE., PHILADELPHIA

operative, P. J. Donnelly, president, to finance construction of approximately 225 miles rural transmission lines serving 517 consumers in two counties.

Nebraska

HASTINGS, NEBR.—Central Nebraska Public Power and Irrigation district, R. O. Canaday, secretary, takes bids until 11 a. m., May 5, on the construction of power distribution substations. Certified check 5 per cent to accompany bids.

YORK, NEBR.—York County Rural Public Power district takes bids to May 11 on construction of 237 miles rural electric transmission lines in two counties. C. C. Cox, Amarillo, Tex., consulting engineer.

Iowa

DAYTON, IOWA—Village, George W. Tarrant, clerk, will soon take bids on furnishing testing equipment for its power plant. Ralph W. Gearhart, Cedar Rapids, Iowa, consultant.

DES MOINES, IOWA—State board of control, H. C. White, chairman, is taking separate bids until 2 p. m., May 5, on 300,000-gallon water tank and tower and 250-kilowatt engine generator. Certified check 5 per cent to accompany bid.

JAMAICA, IOWA—Village, W. D. Jones, clerk, plans to construct a new waterworks costing $21,000. Application filed for PWA funds. Ralph W. Gearhart, Cedar Rapids, Iowa, consulting engineer.

MT. PLEASANT, IOWA—REA allotted $174,000 to the Southeastern Iowa Cooperative Electric association. P. A. Cornick, president, to finance construction of 175 miles rural transmission lines serving 420 consumers.

POSTVILLE, IOWA—Allamakee-Clayton Electric co-operative is making survey for constructing 206 miles of rural power lines for which REA has allotted $214,000. A. W. Grubb, Vinton, Iowa, consulting engineer.

Colorado

DELTA, COLO.—REA has approved a $68,000 allotment to Delta-Montrose Rural Power Lines association to finance construction of 84 miles of rural electric power transmission lines in two counties.

DENVER — Bureau of reclamation asks bids until May 5 for one sine-wave generator set, meter tester and control table for use at Boulder Dam power plant (specification 1223-D); and until May 15 for two hydraulic turbines and two oil pressure governors (specification 835).

TRINIDAD, COLO.—Trinidad Electric Transmission Railway & Gas Co. has been allotted $39,000 by REA for constructing 31 miles of rural distribution lines.

Idaho

LEWISTON, IDAHO—Clearwater Valley Light & Power association, T. C. Smith, chief engineer, will call for bids within 60 days on various additional units in its distribution system, amounting to 200 miles of lines in all.

Pacific Coast

PORTLAND, OREG.—Claussen & Claussen, architects, have completed plans for a proposed $25,000 construction warehouse, including hydraulic elevator, refrigeration and other equipment.

PORTLAND, OREG.—Lloyd A. Fry Roofing Co., Chicago, has awarded contract to Dougan-Hammond Construction Co. for a 150 x 553-foot plant costing total of about $200,000.

PORTLAND, OREG.—Bonneville power administration, 811 Northeast Oregon street, is taking bids to May 12 on potential transformers for power substations.

Canada

SYDNEY, N. S.—Dominion Steel & Coal Corp., Montreal, will soon accept bids for two open hearth furnaces costing $1,000,000. H. L. Foell, engineer, care of owner.

HAMILTON, ONT.—National Steel Car Corp., R. Hart, manager, will soon let contracts for a one-story, 70 x 300-foot machine shop costing $250,000. Hutton & Souter, Hamilton, architects.

PORT COLBORNE, ONT. — International Nickel Co. of Canada Ltd., Toronto, will take bids within three months for reconstructing its smelter plant at cost of $300,000.

TORONTO, ONT.—Falconbridge Nickel Mines Ltd., J. G. Hardy, president, 25 King street, plans to construct a refinery costing more than $250,000. Maturity by summer.

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READER Comments

Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.

"Do Not Kill Incentive"

To the Editor:

I think it would be a good idea to publish complete Mr. Weir's speech delivered at the Weirton Chamber of Commerce banquet recently, (abstracted in STEEL, April 24, p. 33), as I feel there has been, over the last ten years, so much propaganda against individualism and the ability of one man to earn more than the average.

Surely we do not want to kill this incentive in America. To my mind it is the only type of freedom that has made America so great. Even though at times we have had examples where certain men abused their power, still we do not want to limit the opportunities that have always been held out to every citizen in America, that by his own efforts and hard work he can accumulate and build up industry, as Chrysler and Weir have done in the last fifteen years.

This, to my mind, is the worst feature of the new deal theory, the leveling of all earning power in the different classes, regardless of the individual's ability. Naturally this is an advantage to some man like John Lewis, when he takes by way of the check-off and does not have to account for any of the money paid in the way of dues by miners, whom he always claims are underpaid.

I am astounded at times how much this theory is being taught in the schools. It is exactly the opposite to that which was taught prior to this regime, and the young people of this country seem to be imbibing the idea that not only the government but those that have more, due to hard work, owe them a living. So many of the novels written in the last few years, from the one that attacked Washington's character, about twelve years ago, down to today, seem to be written from this point of view.

God knows I never had anything handed to me on a silver spoon except a good strong body that was able to work, but I find certain elements are jealous of even what little I have accomplished or accumulated.

I think the business journals should do everything in their power to clear up in the public mind some of this false propaganda that is being preached in our colleges and by the new deal type politician.

WILLIAM M. BAILEY

William M. Bailey Co.
Pittsburgh

More Pure Iron Powder Data

To the Editor:

The article on "Pure Iron Powder" by A. H. Allen, published in STEEL, April 10, 1939, pages 43 to 54, inclusive, is very interesting and contains much information not readily available.

I was surprised that no mention was made concerning investigations conducted by the bureau of mines, department of the interior, during the past 20 years relating to low temperature reduction of iron oxides and the development of sponge iron processes.

Bulletin 270, "The Production of Sponge Iron," by C. E. Williams, E. P. Barrett and B. M. Larsen, 1927, contains reviews of numerous sponge iron processes, and fundamental chemical and mechanical information that would aid in the design and operation of a 2-diameter rotary kiln-type furnace for producing sponge iron.

Bulletin 296, "Iron Oxide Reduction Equilibria," by Oliver C. Ralston, 1929, presents the properties of the common oxides of iron, their combinations with each other and a critical discussion of existing data.

Bulletin 396, "Sponge-Iron Experiments at Mococo," by Chas. G. Maier, 1937, describes the development of a rotary kiln process for utilizing converted natural gas as the reducing agent, the operation of a 1-ton per day pilot plant, and the production of about 15 tons of steel from sponge iron melted in an open-hearth furnace.

In contrast to the low percentage deoxidation of iron oxides treated in rotary kilns reported in STEEL, pages 45 and 46, my experience with a 2-diameter internally-fired rotary kiln showed that more than 95 per cent of the oxygen was removed from the iron oxides during the production of about 1000 tons of sponge iron.

The results of a number of bureau of mines' investigations relating to the factors governing reducibility of iron ores have been published in the technical press.

We shall be pleased to aid you in obtaining any of these data you may desire.

E. P. BARRETT

Metallurgist,
Blast Furnace Studies Section,
Metallurgical Division,
Bureau of Mines,
Washington

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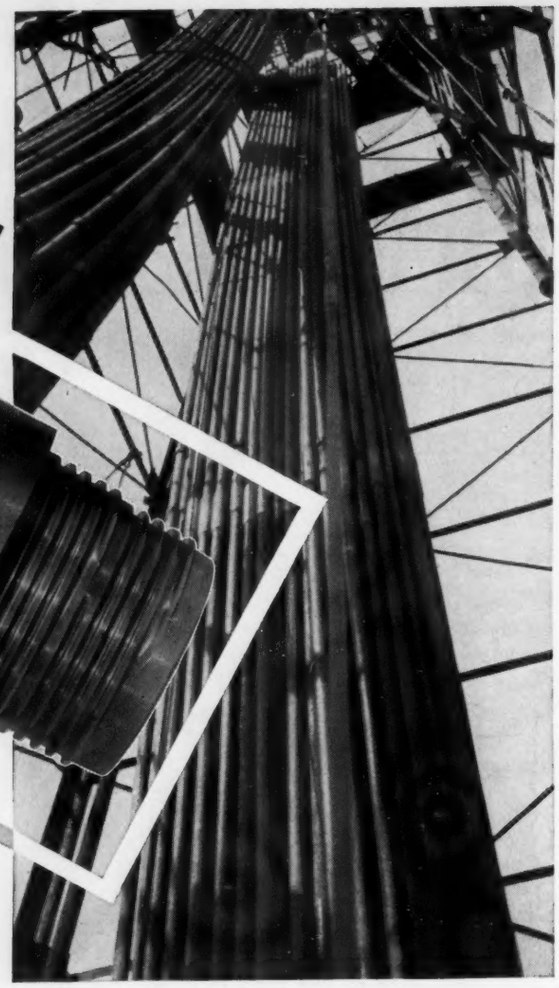

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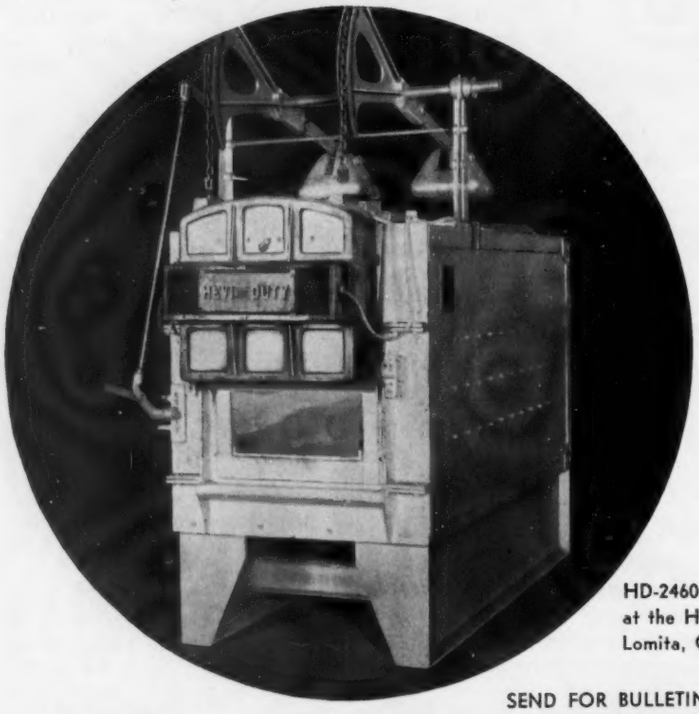

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